PACKAGE engineering

How to "live" with military spec's

First step in using a government packaging specification is to interpret it to your own company by (1) taking it part by part, (2) preparing explanatory drawings, and (3) devising methods for line crews. (See Page 31)

Just how good is European packaging?

Better than you think, according to one discerning observer who reports films and other plastic packaging, along with packaging machinery, making strides, as European packaging gears up for mass production. (See Page 43)

Short-cuts to better gummed tape sealing

Using simple, on-the-spot tests of gummed tape effectiveness, and following through with practical instruction to packers concerning correct application, remind users to be careful, not casual in tape use. (See Page 60)

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FEBRUARY 1960

VOLUME 5 • NUMBER 2

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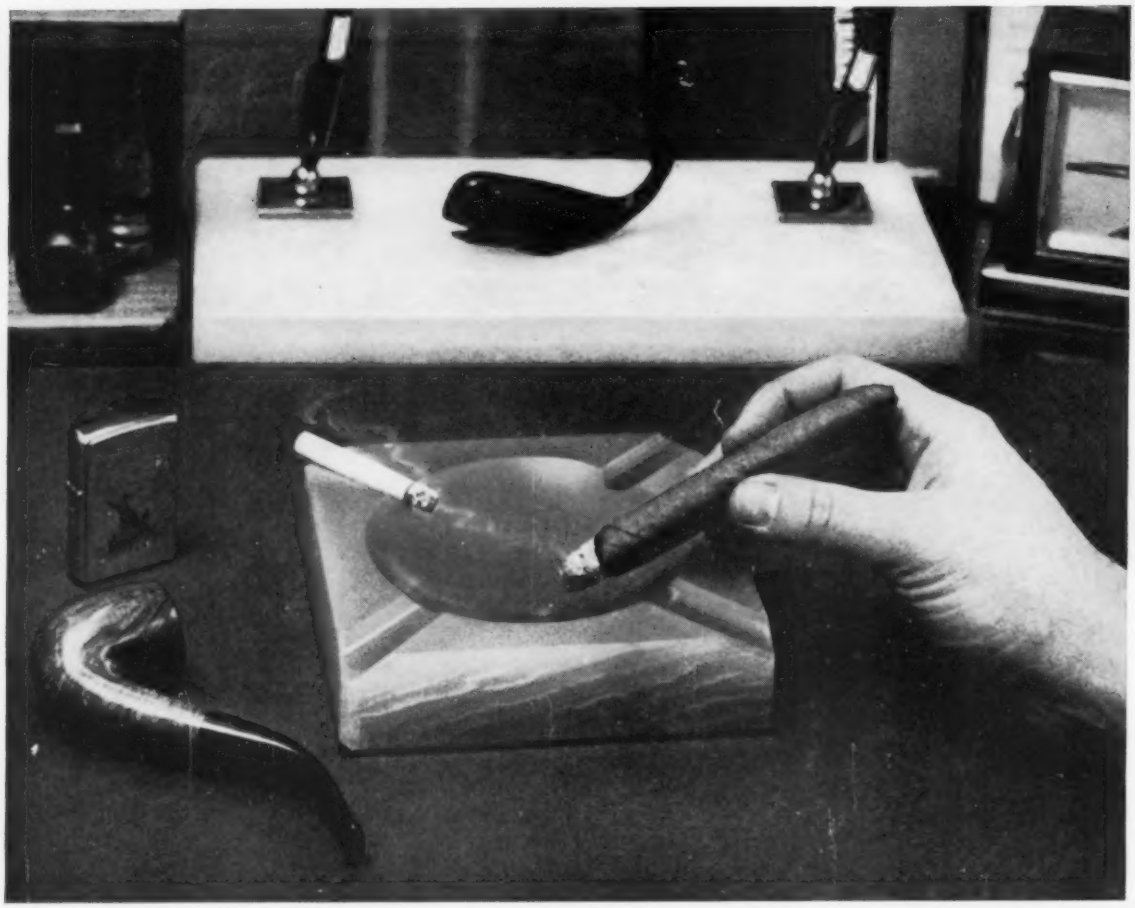

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February 3-5. AMA workshop seminar on the job of the packaging director, Hotel Astor, New York, N.Y. Contact: John L. Wood, American Management Association, 1515 Broadway, New York 36, N.Y. *Telephone: JUdson 6-8100.*

February 8-10. 5th Military-Industry Packaging and Materials Handling Symposium, Sheraton Park Hotel, Washington, D. C. Contact: Lt. Col. George A. Davies, Chief, Packaging Branch, Headquarters, USAF, Room 4312, Munitions Building, Washington 25, D.C. *Telephone: Liberty 5-6700, Ext. 6-2956.*

March 18, 19. The Refrigeration Research Foundation symposium on package environment in refrigerated warehouses, LaSalle Hotel, Chicago, Ill. Contact: Dr. Walter A. MacLinn, director and secretary, The Refrigeration Research Foundation, 12 N. Meade Ave., Colorado Springs, Colo. *Telephone: MElrose 3-2801.*

April 4-6. AMA National Packaging Conference, Shelburne Hotel, Atlantic City, N. J. Contact: John L. Wood, American Management Association, 1515 Broadway, New York 36, N.Y. *Telephone: JUdson 6-8100.*

April 4-7. 29th AMA National Packaging Show, Convention Hall, Atlantic City, N.J. Contact: John L. Wood, American Management Association, 1515 Broadway, New York 36, N.Y. *Telephone: JUdson 6-8100.*

April 19-21. Annual meeting of the Research and Development Associates, Food and Container Institute, Inc., Congress Hotel, Chicago, Ill. Contact: Col. R. A. Isker, secretary, Research and Development Associates, 1819 W. Pershing Road, Chicago 9, Ill. *Telephone: LAfayette 3-5500.*

April 19-23. Interpack and EPF Congress in Dusseldorf, Germany. Contact: Pierre J. Louis, Institut Francais de L'emballage et du Conditionnement, 3 Rue La Boetie, Paris 8, France. *Telephone: ANjou 68-48-72-56.*

June 12-25. Industrial Management Center's 7th Annual Material Handling and Packaging Training Course, Lake Placid Club, New York. Contact: James R. Bright, director, Industrial Management Center, 56 Robbins Road, Lexington, Mass.

October 31-November 2. 22nd Annual National Packaging Forum of the Packaging Institute, Statler-Hilton Hotel, New York, N.Y. Contact: Charles A. Feld, executive director, Packaging Institute, 342 Madison Avenue, New York 17, N.Y. *Telephone: MUrray Hill 7-8875.*

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PACKAGE engineering

AN ANGUS J. RAY PUBLICATION

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Our December, 1960 issue will carry a cumulative editorial index for the year listing our feature articles by subject, author, and other headings.

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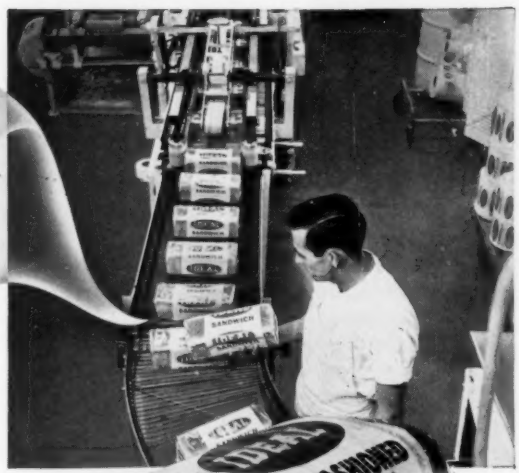

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Judy Van Dam
Assistant Editor

Laurence V. Burton
Contributing Editor

Anne Bernhard
Business Manager and
Circulation Director

Burton Cherry
Art Director

Executive and editorial offices:

185 North Wabash Avenue
Chicago 1, Illinois
Telephone: Financial 6-1440

Advertising sales offices:

Irwin F. Megargee
National Bank Building
Ocean City, New Jersey
Telephone: EXport 9-3519

Arnold Gieseler
299 Madison Avenue
New York 17, New York
Telephone: YUkon 6-8575

Ronald F. Inglehart
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Chicago 1, Illinois
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West Coast representatives:

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A note from the Publisher

Packages must have rational appeals

A recent issue of *Printers' Ink* carried a report on a study made by Dr. Ernest R. Dichter, president of The Motivational Research Institute, for the Greenbelt Consumers Services, Inc.

The report said in part:

"The American housewife is no dope. Despite the fanciful portrait of a woman supposedly shopping in a trance, the homemaker in a supermarket actually is an intelligent, alert and critical buyer who knows what she wants and why."

This is an interesting study. The conclusions reached parallel the thoughts frequently expressed in this column: that an attractive appearing package—while a necessity if a product is to survive in this era of self-service—is seldom enough in itself to get an original sale, and never enough to build repeat sales.

Dr. Dichter does not abandon the emotional appeal of good surface design, as it does exert a great deal of influence on self-service purchases; but he maintains such emotional reactions are accompanied more often than not by a rational evaluation of the facts as the housewife sees them.

Rather than the housewife's being put in a trance by the dazzling display of packages in a retail store, I think too often it is the packager who is in a trance when he fails to recognize this ever-increasing sophistication on the part of the housewife.

Dr. Dichter goes on to say that this rational approach in buying does not necessarily mean the housewife wants a low price, or the lowest price, but wants to feel she is getting her money's worth. It would be naive to assume that price is not a factor, or to infer that consumers are unaware or even unmindful of price.

In my opinion a package certainly has to be attractive, regardless of whether it is packaged for retail sale, institutional sale, or industrial use, but the functional properties can add the very values the alert buyers of today demand. Make sure your package adequately protects your product, not only into the buyer's home or factory, but until it is completely consumed. Are there any convenience factors that could be incorporated into your package—and there are hundreds of them, from pouring spouts for cartons to pouring spouts for 55-gallon drums.

What about the machineability of your package? Could the material or structural design be changed to make it run better or faster on packaging machinery, thus cutting your costs? Or, could *your* package be changed completely from a manual packaging operation to a mechanical packaging operation?

Buyers want value today, and one way you can give more value is to analyze your package thoroughly regarding its functional properties.

Angus J. Ray

Publisher

Package Engineering is published monthly by Angus J. Ray Publishing Co., 185 North Wabash Avenue, Chicago 1, Illinois. Angus J. Ray, president; R. B. Holmgren and I. F. Megargee, vice presidents; James G. Culbertson, secretary, and Ethyl K. Ray, treasurer. Please address articles for publication and correspondence regarding the editorial content to the editor. Statements and opinions expressed in articles and editorials are those of the respective authors, for which Package Engineering assumes no responsibility. Copyright 1960 by Angus J. Ray Publishing Co. The name Package Engineering is registered in the U. S. Patent Office.

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Circle No. 204 on Card, Page 89

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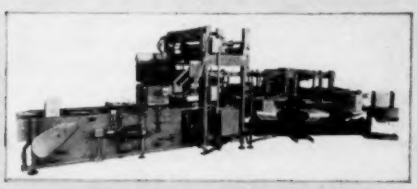

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The PULSE / of packaging

Groups in the news:

American Management Association has awarded a $25,000 grant to Rensselaer Polytechnic Institute to study packaging organization and management in companies among representative industries. Funds for this research came from registration receipts at AMA's annual National Packaging Exposition . . **Packaging Institute** has filed a resolution with the Secretary of Health, Education and Welfare, asking him to extend to March 5, 1961, the period within which food additives used in food packaging may be qualified under the Food Additives Amendment of 1958. PI told the secretary that much information is lacking, there is a shortage of personnel, and that refining of procedures and tests call for additional time. PI's famed technical operations committee is now the technical coordinating board, and the board's newly-elected chairman is W. B. Tibbets, Union Carbide Plastics Co.

Packaging across the seas:

The Finnish industrial enterprise "Tampella" is building and equipping at Heinola, a new mill for large scale manufacture of hardwood semichemical corrugating medium. It should produce 100,000 tons annually by the end of this year, then will boost its capacity to 15,000 tons. The **Finnish Paper and Timber Journal** tells us that Finnish birch hardwoods make possible "outstanding" flat-crush resistance of corrugated board using medium made from this semichemical pulp.

We hear that Europe is showing more interest than ever in packaging specification research and in developing company packaging organization to make sure packaging coincides with specifications . . . **U. S. Industrial Chemicals Co-International** has been formed in Switzerland; its activities will include technical service to European polyethylene processors.

Armour & Co. is working with the British Ministry of Food, expecting to develop a freeze-drying process of preserving various foods. A high-ranking company official is now roaming Europe in search of products the packer might develop . . . The technical and research committee of the **European Packaging Federation** is one of EPF's most active committees, is hard at work seeking to standardize testing methods in the various packaging laboratories throughout Europe. . . . **Owens-Illinois Glass Co.** has purchased a minority interest in **Glashuttenwerke**, and has reached agreement with this German company to exchange technical assistance and patent licenses.

Trends to watch:

Industry shipments of plastic bottles in 1960 "might very possibly" hit a rate of one billion units, according to **Continental Can Co.** It foresees expansion of plastic bottle usage for high-volume items, such as detergents . . . Noting that aluminum foil shipments during 1959 ran 32 per cent above those of 1958, the **Aluminum Association** says aluminum producing facilities ran at near-capacity levels. Aluminum Co. of America predicts that shipments of U. S.-produced aluminum during 1960 will be the largest in history.

Celanese Plastic Co. says that high-density polyethylene achieved a 90-million-lb. sales volume during 1959, and that future consumption of it could accelerate on a scale approaching the growth rate of recent years . . . **Union Carbide Plastics Co.** asserts "the most significant" trend in plastics in 1959 was "the tremendous surge" in use of polyethylene film. It says the long term outlook for continued rapid growth of polyethylene film remains "good."

More expansion for packaging:

Hoerner Boxes, Inc. is building a new 20,000-sq.-ft. sheet plant at Mission, Tex. . . . At Plainfield, Ill., **Hazel-Atlas Glass Div., Continental Can Co.**, plans to build a $1.5-million research and development laboratory . . . **Southwest Forest Industries, Inc.** (formerly Southwest Lumber Mills, Inc.) has recently purchased the **Dolan-Burrus Box Co.**; has started construction of a 101,000-sq.-ft. plant in Glendale, Ariz. to produce corrugated board and finished containers; has effected a consolidation with **Wilson Paper Co., Vernon Container Corp.**, and **Pioneer Wrapping Co.** —all Los Angeles paper products companies; has announced plans for a $40-million pulp and paper mill in Northern Arizona.

Celanese Corp. of America has acquired **Royal Manufacturing Co., Inc.**, and will expand Royal's plants at Prescott, Ariz. and Chicago, and will start operation of a new plant on the East Coast. **Celanese Plastics Co.** is expanding the capacity of its high-density polyethylene plant at Houston to 50 million lb. a year . . . The $800,000 expansion and improvement program at **Stone Container Corp.'s** boxboard mills at Mobile, Ala. and Franklin, Ohio has been completed . . . **Print-A-Tube Co.** has been purchased by and made a division of **Lassiter Corp.**

Through an exchange of shares, **Federal Paper Board Co.** has arranged to acquire the **Manchester Board and Paper Co., Inc.** . . . Carload shipments of polyethylene resin, in 100,000-lb. quantities, are now being delivered to extruders and fabricators from **The Dow Chemical Co.'s** Texas division . . . A new corporation, **Seal-A-Round Corp.**, has been formed to manufacture and distribute a polyethylene packaging machine.

Crown Cork and Seal Co., Inc. has opened its new can plant in Winchester, Va. . . . A polypropylene plant with capacity of 20 million lb. annually will be built by **Eastman Kodak Co.** in Longview, Tex. . . . To provide toxicological services to the chemical, food, drug, and cosmetic industries, **Industrial Bio-Test Laboratories, Inc.** plans enlarged research laboratory facilities in Northbrook, Ill.

AviSun Corp.'s New Castle, Del. facilities are now in commercial production of polypropylene film . . . In Dallas **Olin Mathieson Chemical Corp.'s** new 45,000-sq.-ft. corrugated container sheet plant (production capacity: 5,000,000 sq. ft. of corrugated containers per month) has started production . . . A $2-million research and technical service center will be constructed on a 100-acre site in Macedon, N. Y., by **Kordite Corp.**

Minnesota Mining and Manufacturing Co. plans a $10-million, 14-story administration building at its research center just east of St. Paul, Minn. . . . **Owens-Illinois Glass Co.** will increase its semi-rigid plastic bottle production by building a new plant in North Kansas City, Mo., and increasing facilities in St. Charles, Ill. and Glassboro, N. J.

What people are doing:

Libby, McNeill & Libby has appointed **M. T. McEvoy** general manager of its Florida citrus operation . . . **John D. Czarnecki** is now director of research, container division, The Sherwin Wil-

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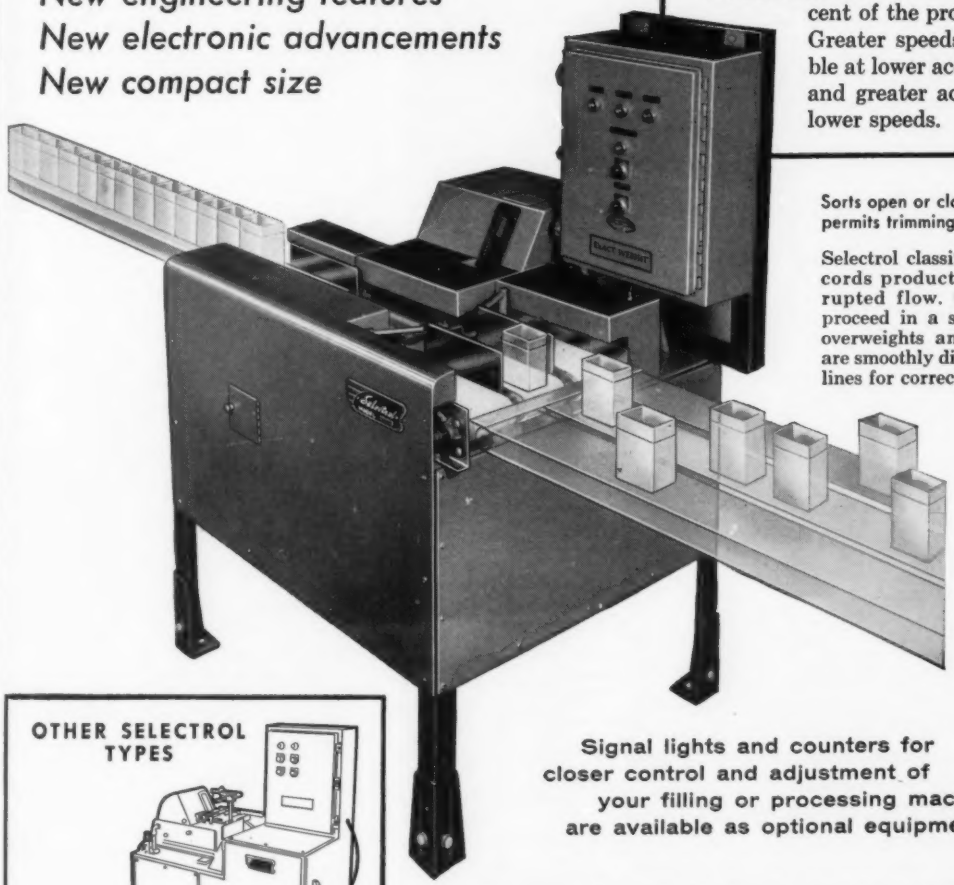

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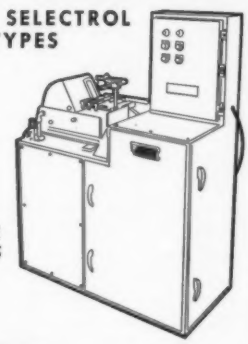

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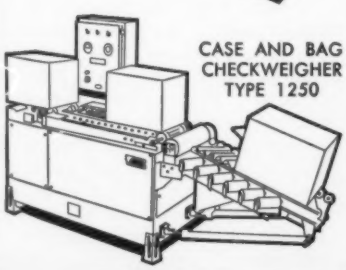

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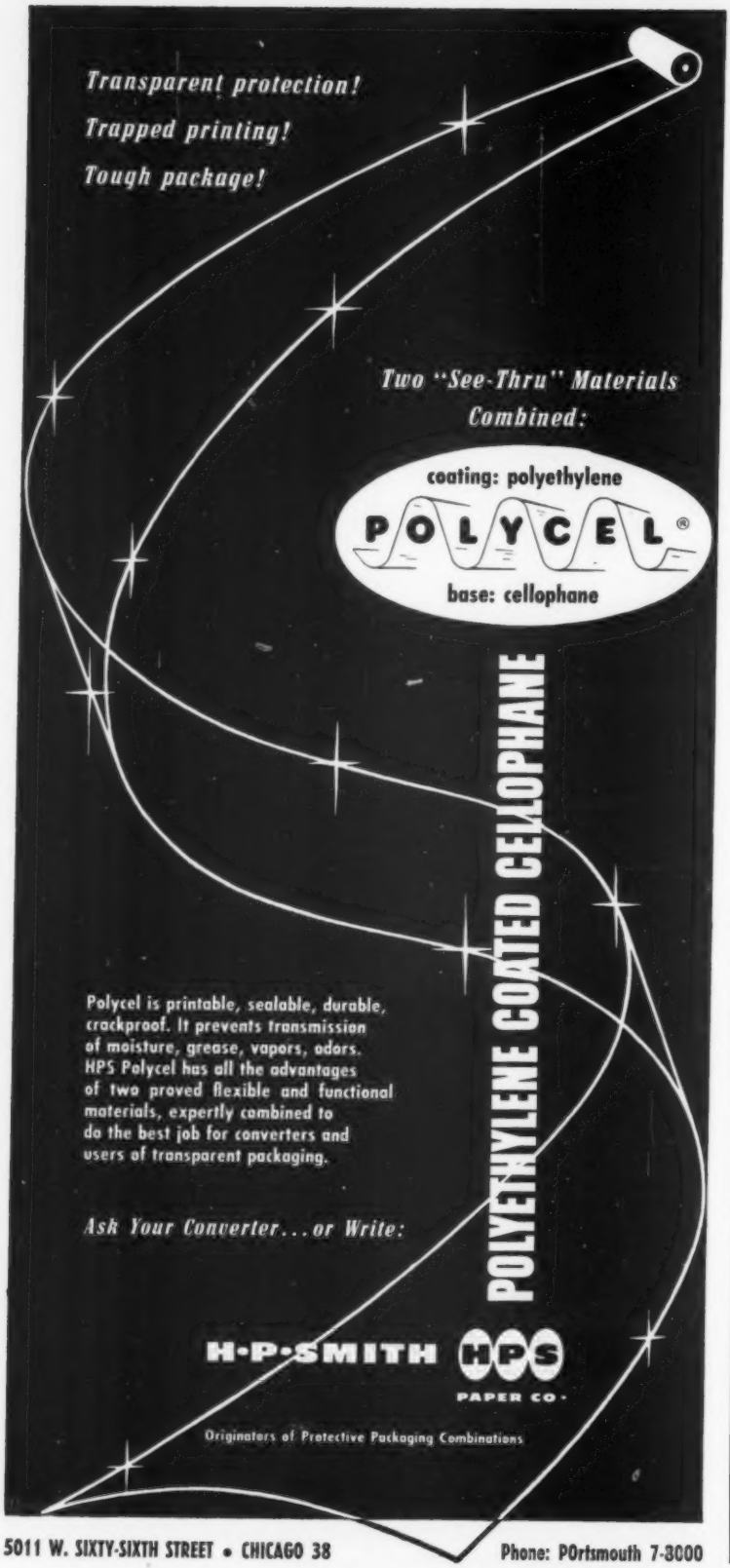
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liams Co. . . . Wisconsin Alumni Research Foundation has named **Robert F. Prier** as assistant director of laboratories and **John J. Birdsall** as assistant to director of laboratories.

Federal Paper Board Co., Inc. has elected four new vice presidents—**Dr. Henry Blau, Wilfred M. Wyburn, John R. Kennedy, Jr.,** and **Sven E. Soderbergh**—and a new treasurer, **Dermott Noonan** . . . **J. J. Kieley** is now manager of cost and pricing in the marketing division of H. J. Heinz Co. . . . New executive vice president in charge of operations at Rapid-American Corp. is **Harold S. Divine.**

Francis J. Dunleavy has been named general manager of the industrial and automation division, Radio Corp. of America . . . Promotions at International Paper Co.'s fine paper and bleached board division are: **R. H. Hinman,** manager of Chicago regional office and Midwestern assistant manager; **George Stuhr, Jr.,** assistant to sales manager; **L. T. Krumm, Jr.,** manager of bleached board sales.

The Kartridg-Pak Co. has named two new sales and service representatives in the Atlantic coast regions—**George McAteer** and **Jack Jecker** . . . **Kevin J. Solon** is now director of product planning and marketing research of Owens-Illinois Glass Co.'s paper products division . . . R-W Paper Co. has transferred **David F. Forsman** to sales representative, San Fransisco Bay and Central California area . . . Two executive appointments at National Can Corp.'s Atlantic division are **Arnold R. Twietmeyer,** assistant controller, and **A. R. Jorgensen,** sales manager.

Diamond National Corp. has elected **Alfred H. Wilhelm** a vice president, and **John Lambie** a vice president in charge of U. S. Printing & Lithograph Div., the Gardner Div. and Brooks, Inc. . . . New vice president in charge of marketing and sales for Aluminum Foils, Inc. is **Thomas W. Allison** . . . **William S. Ziegfeld** has been named assistant chief packaging engineer of Armstrong Cork Co.

John F. Fila is now assistant superintendent in charge of converting operations at the Chatham division of Columbia Box Board Mills, Inc. . . . Arthur Colton Co. has appointed **David J. Richards** sales engineer, Chicago office . . . **John J. Luviano** has been named general manager of Crown Cork & Seal Co., Inc.'s machinery division . . . **Andrew J. Alessi** has joined Bell-Mark Corp. as vice president in charge of sales engineering.

Charles S. Wicks has been named manager of the Chase Bag Co.'s manufacturing plant in New Orleans . . . Abbott Laboratories announces that **Richard Dewey,** packaging engineer, has completed 25 years of service, and Ar-

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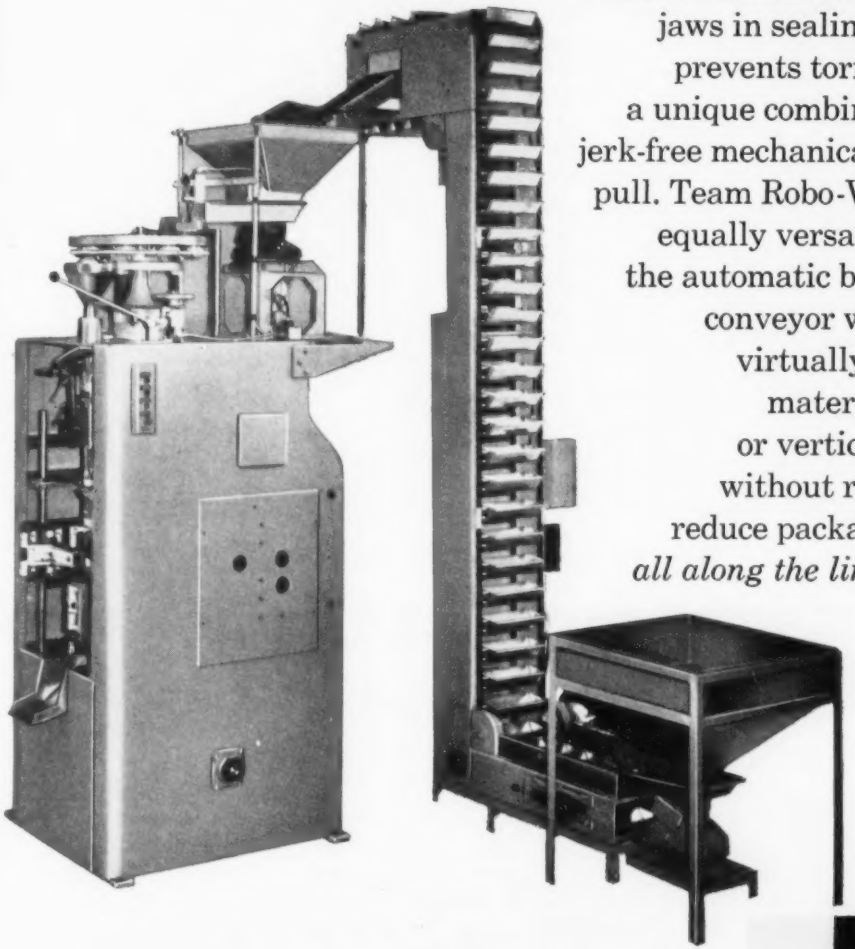

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Cushman Baking Company, Portland, Maine, wraps both its New England and Home Type bread in printed polyethylene film; reports increase in sales, decrease in stales! New polyethylene wrapper keeps bread feeling fresher longer, is easier for housewife to open and close.

Sutherland Paper Company, Kalamazoo, Mich., found that using polyethylene film for overwrapping its paper plates eliminated cracking, shrinking and puncturing of the package—in storage, shipping, and handling. Results: Customer complaints dwindled and Sutherland can now maintain a sufficient inventory to meet demands of rush seasons.

NO TWO SHAPES ALIKE...

Yet every product is packaged a

Royal Wove Envelope Company, Los Angeles, Calif., was able to cut costs substantially when it switched to polyethylene film for automatic wrapping of envelopes. Packaging expenses were lowered. Breakage was sharply reduced. Returns stopped. Reorders increased.

Hottest new sales builder in food packaging is IQF—Individually Quick Frozen food packaged in polyethylene. Flav-R-Pac brand corn, peas, beans, are individually frozen and packaged in large 2-lb. polyethylene bags, colorfully printed. Housewife pours out amount she wants; puts remainder back in freezer.

automatically in polyethylene!

How Does Your Product Shape Up When It Comes to Packaging?
Irregular shapes, soft goods, flexible or rigid products . . . all can be automatically packaged in sparkling clear polyethylene film. And new high-speed machine developments make it even more economically attractive.

Protection and Sales Appeal . . . and the Lowest Price for Any Transparent Film
Polyethylene film advantages only begin in its low cost! With this economy comes protection because tough, flexible polyethylene is tear-resistant . . . stands up to counter display . . . protects while it shows your merchandise off to its best advantage.

Ask the Experts
Leading automatic packaging machine manufacturers will be glad to bring you up to date on their new equipment using film made of BAKELITE Polyethylene. Or contact Dept. BM-53M Union Carbide Plastics Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, New York, for the special packaging booklet that gives you facts and figures on this low cost film. In Canada, address Carbide Chemicals Company, Division of Union Carbide Canada Limited, Toronto 7.

UNION CARBIDE

BAKELITE and UNION CARBIDE are registered trade marks of Union Carbide Corporation.

Labeling Lines

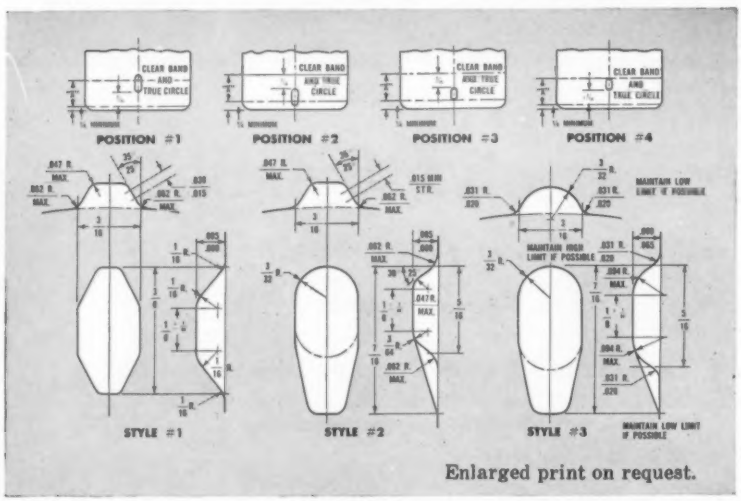
by George L. N. Meyer, Jr.

SPOTTING BARS

"Spotted" bottles are becoming more prevalent in the food and drug field and, of course, are already extensively used in the distilling industry. The practice of orienting labels, strip stamps or cellulose bands, on a specific area of the bottle, calls for sound preliminary planning.

The use of a raised spotting bar often leads to questions as to where it should be located?—what size should it be?—and, what shape should it take? We recently invited several key people in the bottling field to take part in a Glass Labeling Seminar* in our home offices, and considerable time was devoted to this problem. As a result of this study we have arrived at certain specifications for a spotting bar on a round bottle. The drawings, which follow, illustrate this standard. If an enlarged print would be useful we will be happy to furnish one or more on your request.

**If you would be interested in attending one of our labeling Seminars here in Worcester, please let us know. We'll be happy to have you take part in these general discussions of labeling problems.*



Enlarged print on request.

1. Dimension "X" dependent on choice of spotting bar.
2. Style of spotting bar numbered in order of preference.

World's Largest Manufacturer of high-speed Labeling Machinery

WORLD LABELERS

ECONOMIC MACHINERY COMPANY • Worcester 3, Mass. / Div. of Geo. J. Meyer Manufacturing Co.

chie Krumrey, package technician, 20 years—both of the package standards department . . . Two assistant product manager appointments in the foil and container division of Kaiser Aluminum & Chemical Sales, Inc. are **Frank L. Sherman,** laminated foil sales, and **J. Robert Kitchen,** container sales.

Personnel changes at Thomasson of Pennsylvania, Inc. are: **John J. McAnally,** assistant to the president, in charge of special projects; **Louis R. Bigelow,** assistant sales manager, and **Graydon Cass,** supervisor of laboratory staff, in charge of quality control and product development . . . Bemis Bro. Bag Co. has transferred **T. I. B. Gray** from general sales department to packaging service department. Bemis' subsidiary, Morgan Adhesives Co., will be represented in New York and on the East Coast by **C. J. Lee.**

New appointments at Continental Can Co. are—**Forest A. Lay,** sales manager for general line food cans. central metal division; **Douglas Allan,** plant manager, Haverhill, Mass. facility, boxboard and folding carton division; **Robert J. Murphy,** manager, Teterboro, N. J. corrugated box plant; **David G. Roggenkemper,** manager, Carteret, N. J. fibre drum plant, and **P. N. Smith,** assistant products sales manager, nonfood can group . . . The newly-created position of commercial analyst for Hinde & Dauch Div., West Virginia Pulp and Paper Co., will be filled by **James D. Yarnell.**

Macauley Whiting, general manager of The Dow Chemical Co.'s Midland Div., was elected a member of the board of directors. In Dow's coatings technical service group: **M. W. Zembal** will take charge of operations at Freeport, Tex.; **Roy C. Simon** is now section head of operations in the West; **Ralph C. Hand** is section head of a new group, the plastics and rubber section; **A. A. Hill** succeeds Mr. Hand as section head of building products; **Stanley F. Roth** is now section head in charge of the packaging section . . . At the Dobeckmun Co., **Nicholas R. Sheehan** has been promoted to the industrial sales division . . . **A. Irving Totten, Jr.** will be general director of Reynolds Metals Co.'s new packaging research division.

At St. Regis Paper Co.'s Canton corrugated box division, **Richard C. Burton** has been named general manager. and **Robert J. Ress** succeeds him as sales manager. Other appointments are: **Douglas Adams** production manager; **Dan L. Pickering,** new products sales promotion; **Royal Keyes,** assistant to sales manager in charge of sales service, and **Ieuan D. Thomas,** chief packaging engineer. **Everett G. Griggs II, G. Corydon Wagner** and **W. Hilding Lindberg,** all senior executives of St. Paul & Tacoma Lumber Co. Div. of St. Regis Paper Co.,

MOVE IT

in DI-CEL cartons

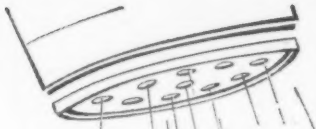
Reduce your handling costs, cut spoilage, get high packaging line speed with CCA's DI-CEL® system—a new combination of machinery and cartons. DI-CEL provides unique packaging flexibility for a variety of fresh and frozen baked goods. Items can't roll or break in transit. Tops are fully exposed, instead of sides, for maximum sales appeal.
To **pack it—move it—sell it** is the business of CCA packaging. For details...

CONTAINER CORPORATION OF AMERICA

CCA

Chicago 3...and all key marketing areas. Folding Cartons, Shipping Containers, Sefton Fibre Cans, Molded Plastic Products

For more information circle No. 209 on Reader Service Card, Page 89



WS SIFTER TOPS make Dollars and Sense

In the shifting sands of spice sales, WS SIFTER TOPS are taking a strong stand.

Women like them.
Men like them.
Everyone likes the convenience they add to your package.
YOU'LL like what they do to your sales.

WS SIFTERS are easy to apply—just snap on. They do double duty—no cap liner is necessary.

IF YOUR PRODUCT IS SIFTABLE GET FULL INFORMATION ON WS SIFTER TOPS
Ask your WS salesman, write, or call collect—Warwood 1540

WS makes lead and aluminum tubes, too, and all kinds of hard and soft plastic caps, tips, and fitments—delivered on schedule, right to your door by fast motor freight.

WS WHEELING STAMPING CO.
wheeling • w. va.

New York, N. Y., Oxford 7-1346 • Chicago, Ill., Palisades 5-3020
Cleveland, Ohio, Academy 6-5757 • Cincinnati, Ohio, Parkway 1-5736
St. Louis, Mo., Parkview 7-7380 • Los Angeles, Calif., Pleasant 2-0791

have retired but remain available as consultants. Effective with the retirements, **Jack M. Lamb** is now general manager for Tacoma operations; **S. Kepple Pratt** succeeds Mr. Lamb as resident manager of the Tacoma mill, and **Charles L. Morey** has been appointed resident manager of the St. Paul & Tacoma Div. operations.

Dr. Walter A. Dean has been named assistant director of research for Aluminum Co. of America . . . At E. I. du Pont de Nemours and Co. (Inc.)'s film department, **Robert R. Smith** has been appointed director of sales. He succeeds **J. Edward Dean,** who becomes director of the advertising department. Packaging sales division has added a customer service and technical representative, **R. Dean Carnegie.** Appointments at the Freon products division are **Lewis G. Kirk** and **Peter V. Ricciardi,** sales representatives, Chicago and New York districts, respectively, and **Lammot D. Copeland, Jr.,** sales correspondent, Western district, Palo Alto, Calif.

Dr. Reginald L. Wakeman has been named director of technical research and development of Packaging Corp. of America . . . At Plax Corp., **Richard J. Morcom** has been appointed manager, technical service, film and sheet sales division, and **Lawrence D. Barr** and **Merlin L. Evans,** section supervisors, research and development department . . . **Henry A. Thouron** has been named general manager of Hercules Powder Co.'s new international department.

Farris W. Smith has been named design and development engineer for L.A. B. Corp. . . . Michigan Carton Co. has elected **Robert G. Pender** member of the board and vice president, board sales, and **Louis J. Philipps,** vice president, engineering . . . **A. W. Peters,** formerly associated with Standard Packaging Corp., has joined Queen Transparent Specialties Co. as sales and production coordinator in laminated and extrusion coated materials . . . At Crown Zellerbach Corp., **Nick Boylon** is now assistant vice president and general manager for manufacturing, and **Bob Edwards** is assistant vice president for manufacturing in charge of mill operations, California, Louisiana, Ohio and New York. **William Rodgers** has joined CZ as senior analyst, marketing research. At Western Waxide Div., **Jim Simpon** has been promoted to divisional purchasing agent, San Leandro, and **C. Ken McCourt,** to district sales representative, frozen foods, Seattle.

Eugene W. Gehm has been named sales manager of Vulcan Containers Inc. . . . Two new sales representatives for United Shoe Machinery Corp.'s industrial sales division are **Robert E. Davis** and **John A. Rush** . . . National Packaging Corp. has appointed **A. S. Houston** its Midwest sales manager. (*End*)

For super SPEED and PERFORMANCE in stapling cartons . . .

the ALL-NEW INTERNATIONAL

HAND BOXER

Completely Redesigned!
Lighter in Weight!
Easier-to-Set Controls!
Lower Cost Carton Closing!

Only Portable Stapler With All These "Big Machine" Features:

- **Penetration Adjustment!** For complete product protection a simple twist of dial accurately controls staple depth.
- **Clinch Control!** A turn of the quick-set knob adjusts the staple grip for secure packaging.
- **Floating Magazine!** Minimizes jamming and can be removed in seconds without major disassembly — an exclusive feature in I.S.M. machines.
- **Sure-Grip Handle!** Smooth, self-returning action lessens operator fatigue, and contributes to faster carton closing.
- **All-Aluminum Frame!** Precision designed for longer service and easy, lightweight operation.
- **Heavy-Duty Anvils!** Special high-tensile steel resists damage.

CALL YOUR INTERNATIONAL DISTRIBUTOR FOR FREE DEMONSTRATION
or write for illustrated brochure . . .

INTERNATIONAL *Gold Crown*

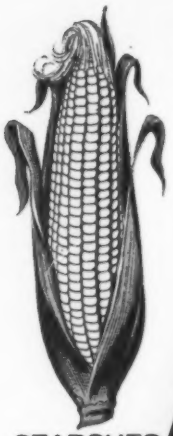
International Staplers

INTERNATIONAL STAPLE & MACHINE COMPANY
P. O. BOX 270 • HERRIN, ILLINOIS

Originators of Carton Closing Staplers

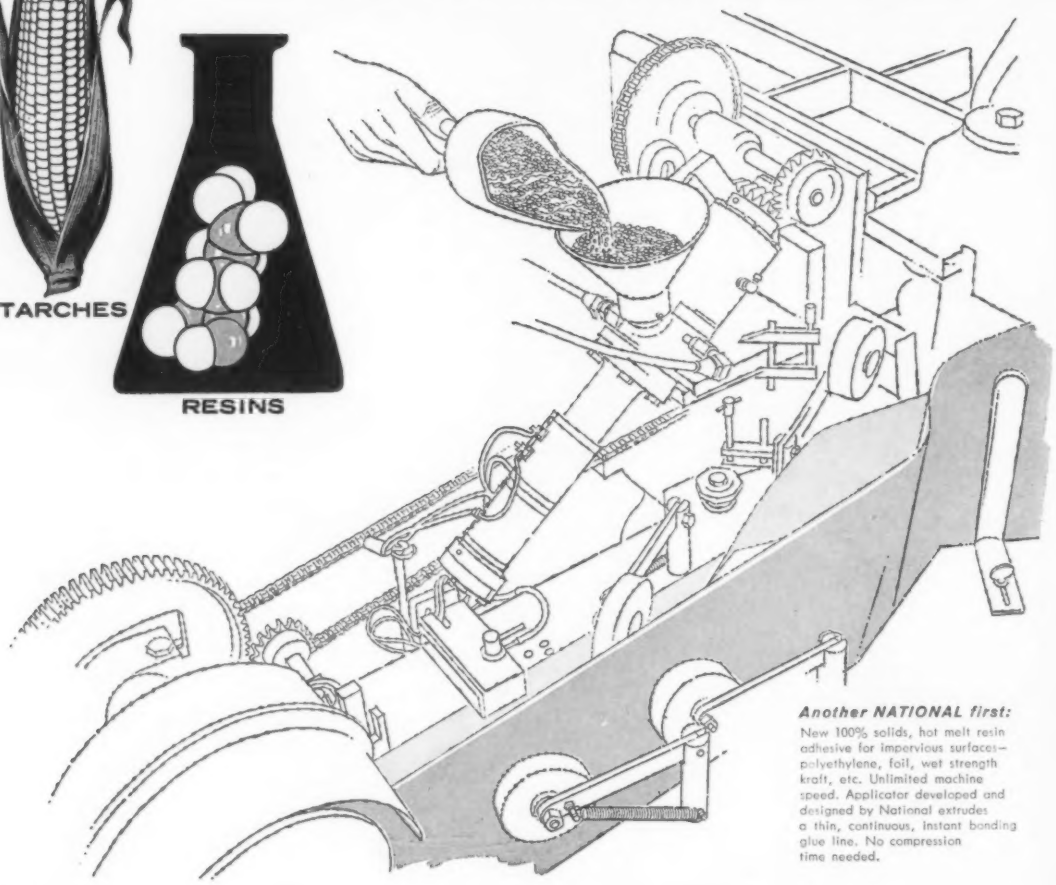
"Cross Pollination"

GENETICS + SYNTHETICS + ADVANCED THINKING



STARCHES

RESINS



Another NATIONAL first:
New 100% solids, hot melt resin adhesive for impervious surfaces—polyethylene, foil, wet strength kraft, etc. Unlimited machine speed. Applicator developed and designed by National extrudes a thin, continuous, instant bonding glue line. No compression time needed.

Creates basic advances in Package Making

The genetic "cross pollination" of hybrid corn to produce unique strains . . . and the chemical "cross pollination" of corn starch to produce unique starch derivatives . . . plus "cross pollination" with vinyl acetate polymers and copolymers in emulsion form . . . have given NATIONAL complete flexibility of formulation in creating new and unique starch and resin adhesives for packaging.

That's one great advantage.

An even greater customer advantage is NATIONAL's unmatched technical service. It's based on the "cross pollination" of our advanced thinking in adhesive research and our broad technical field experience.

This unique "cross pollination" of genetics, synthetics and advanced thinking has resulted in a wealth of know-how, not generally possessed by individual packaging companies.

NATIONAL's "cross pollinated" technical service is available for the asking . . . to help build product features that become decided competitive advantages for you.

You'll find our packaging adhesives—everywhere!

National
STARCH and CHEMICAL CORPORATION
750 THIRD AVENUE, NEW YORK 17, N. Y.

Waldorf KNOWS Packaging

and here's the team behind every Waldorf package

Waldorf Package Designers will give your package every feature of protection, convenience and appearance that it requires.

Waldorf Mechanical Packaging Engineers develop automatic machines that save money. They have invented machines for packaging everything from major appliances to weiners.

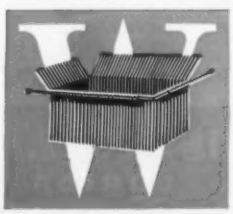
Waldorf Packaging Artists create package designs that sell . . . based on merchandising "know-how."

Waldorf packaging experience saves you money

Waldorf Production Men are graphic arts experts . . . skilled craftsmen. They know every facet and technicality of engraving, plate making, printing, ink selection, die cutting and finishing.

Waldorf Paper Mill Chemists and Technicians "tailor-make" paperboard to do a given job . . . meet a specific need. They examine paperboard for printing surface, smoothness, ink receptivity and many other properties. Physicists test physical performance of paperboard and packages for toughness, density, stiffness, moisture resistance . . . and dozens of other standards.

Waldorf Packaging Research develops new uses for paperboard and new paperboard for new uses. Field research is conducted in factories, processing plants and warehouses to find new methods of handling, opening, loading, filling, closing and marking packages. Waldorf has helped hundreds of companies save time — labor — money.



Every member of Waldorf's talent team has three things in common: each is an expert *in his particular field* whether he is a chemist, artist, designer, printer or mechanical engineer; each knows how to apply his *specialized knowledge* to packaging; all are constantly striving to eliminate "over-packaging" without sacrificing any product protection or package requirement.

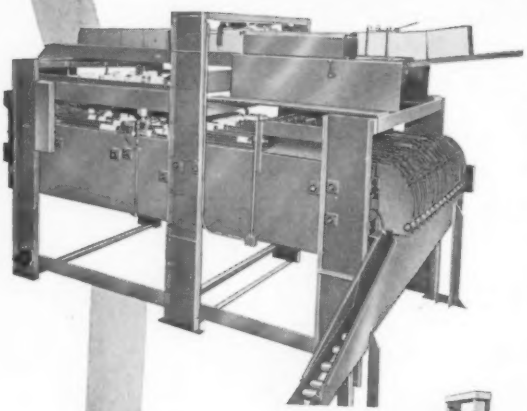
Whether you buy packages by the skid-load or the train-load you'll find Waldorf is a good team to do business with . . . try us.

WALDORF **PAPER PRODUCTS COMPANY** ST. PAUL 14, MINN.

WHICH MACHINE IS BEST FOR YOU?

A-B-C *automatic* CASE UNLOADERS and UNSCRAMBLERS

(No Operator Required)

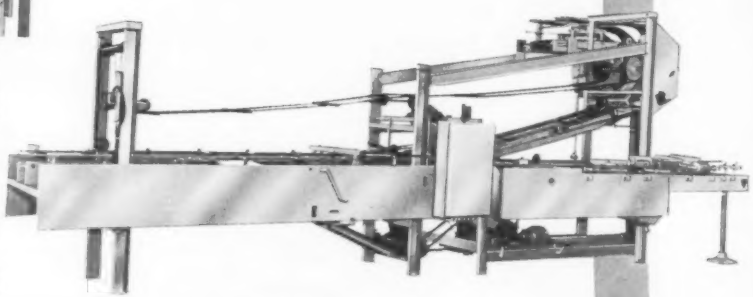


Model K...800 Cans Min.

Put this Model K on the job—get STEEL or ALUMINUM CANS automatically unloaded and unscrambled out of single or multi-tier reshipper cases in a jiffy. Fast continuous operation. Will not mar litho labels. This multiple speed machine discharges cases in an upright position and has operating features unequalled in reducing maintenance costs.

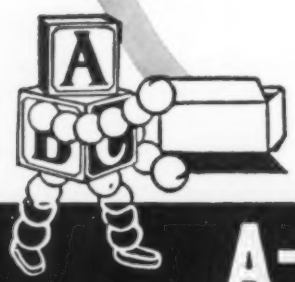
Other A-B-C PACKAGING EQUIPMENT

- CASE SEALERS
- CASE OPENERS
- CASE PACKERS



Model G...30 Cases Min.

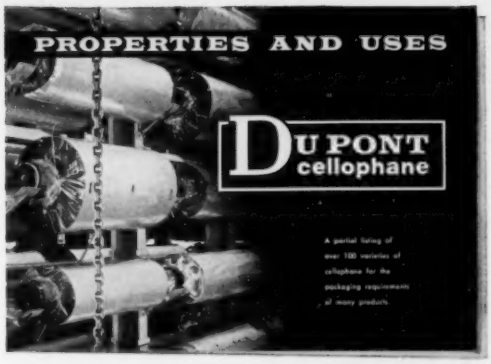
This model is adaptable for unloading glass or cans in single tier cases with continuous motion which permits the highest speeds. Simplicity of design reduces production stoppages and is not dependent on manual operation. Adjustable to a wide range of sizes.

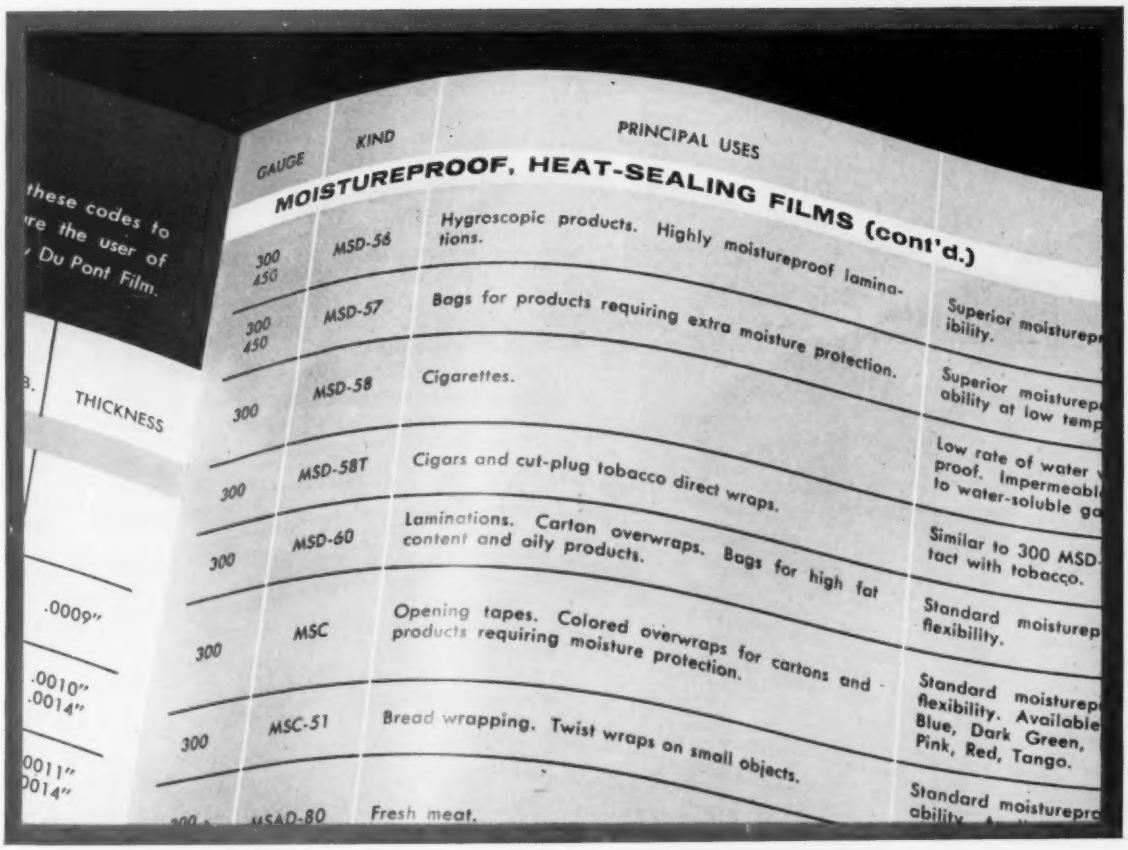


WRITE TODAY FOR DETAILS — FLOOR PLANS and SPECS

A-B-C PACKAGING MACHINE CORP.
TARPON SPRINGS, FLORIDA

Free booklet for Package Engineers!





This guide to types of Du Pont cellophane will prove a handy reference folder for you. To help your package planning, it lists principal properties and uses, yield, gauge and other facts for over 30 Du Pont cellophanes.

For more complete details and assistance in evaluating your specific needs, it always pays to contact your Du Pont Representative. He's your best source of service.

Fill in and send the coupon for your copy of this newly revised "Properties and Uses" folder.

DU PONT
REG. U.S. PAT. OFF.
BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY

DU PONT cellophane

E. I. du Pont de Nemours & Co. (Inc.)
Film Department, N-10414, PE2
Wilmington 98, Delaware

Send my free copy of your new "Properties and Uses of Du Pont Cellophane" guide. (A-12546).

*Name*_____ *Title*_____

*Company*_____

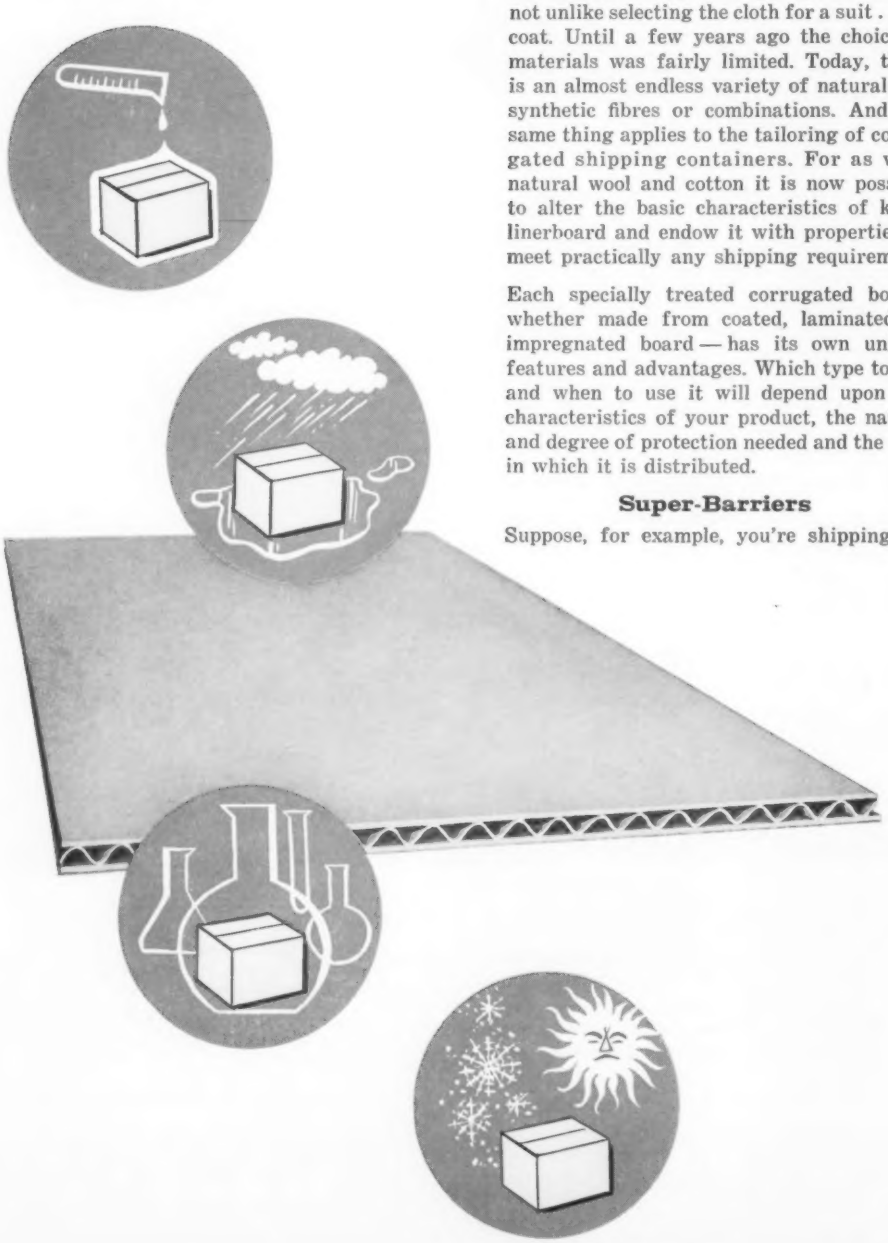
*Street*_____

*City*_____ *Zone*_____ *State*_____

For more information circle No. 215 on Reader Service Card, Page 89

What you should know about

When should your corrugated



Selecting the most appropriate type of linerboard for your shipping container is not unlike selecting the cloth for a suit . . . or coat. Until a few years ago the choice of materials was fairly limited. Today, there is an almost endless variety of natural and synthetic fibres or combinations. And the same thing applies to the tailoring of corrugated shipping containers. For as with natural wool and cotton it is now possible to alter the basic characteristics of kraft linerboard and endow it with properties to meet practically any shipping requirement.

Each specially treated corrugated box — whether made from coated, laminated or impregnated board — has its own unique features and advantages. Which type to use and when to use it will depend upon the characteristics of your product, the nature and degree of protection needed and the way in which it is distributed.

Super-Barriers

Suppose, for example, you're shipping an

For more information circle No. 216 on Reader Service Card, Page 89

special board for Union Boxes

box get special treatment?

item that requires positive protection against moisture attack. Asphalt laminations and certain plastic coatings may offer an excellent solution. Other coatings and laminations, such as glassine, make an effective barrier to the migration of grease and oil. Still others resist chemical attack or provide insulation against temperature extremes. There are even special coatings that inhibit the transmission of gases — a property often capitalized upon where aromatic scents and flavors must be retained.

In addition, there are special wax or plastic coatings that may be applied to the interior of boxes to protect items such as highly polished furniture, or delicate textiles from abrasion and picking. In some cases these coatings may also be used as release agents to facilitate emptying the box of its contents.

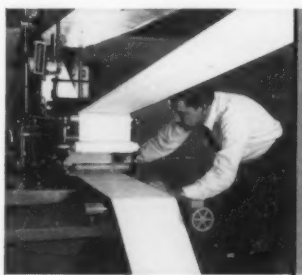
At the other end of the scale, there are special non-slip or non-skid coatings which give a rough high friction "skin" to the outside of the box. This built-in safety factor has helped save thousands of dollars in reduced damage costs and speedier handling and warehousing.

Added Security, Sales Appeal

Increasingly too, varnish applications are being applied to container-board to protect surfaces against scuffing and to help create greater eye and sales appeal by imparting a slick, glossy finish and background for printed art and copy.

This modern "marriage" of different materials to basic kraft board has made possible outstanding new shipping economy and efficiency. It has also opened up a host of hitherto unheard of uses for corrugated boxes.

Ask your Union Box representative to tell you more about them — and how they might profitably be applied to your product or packaging operation. He'll be happy to do so. It's another part of the Union Box complete packaging service to all corrugated shippers.



This machine in Union-Camp research laboratory laminates and coats paper and board with water- and solvent-based solutions which need no heat during application.

Special impregnated board solves problem of shipping oily agricultural twine. Resistance to water and oil strike-through increases product protection — leaves box clean and neat.

Good skid resistance, here being measured at Union-Camp's laboratory, is often an important factor in better box handling, stacking and palletizing.

union camp

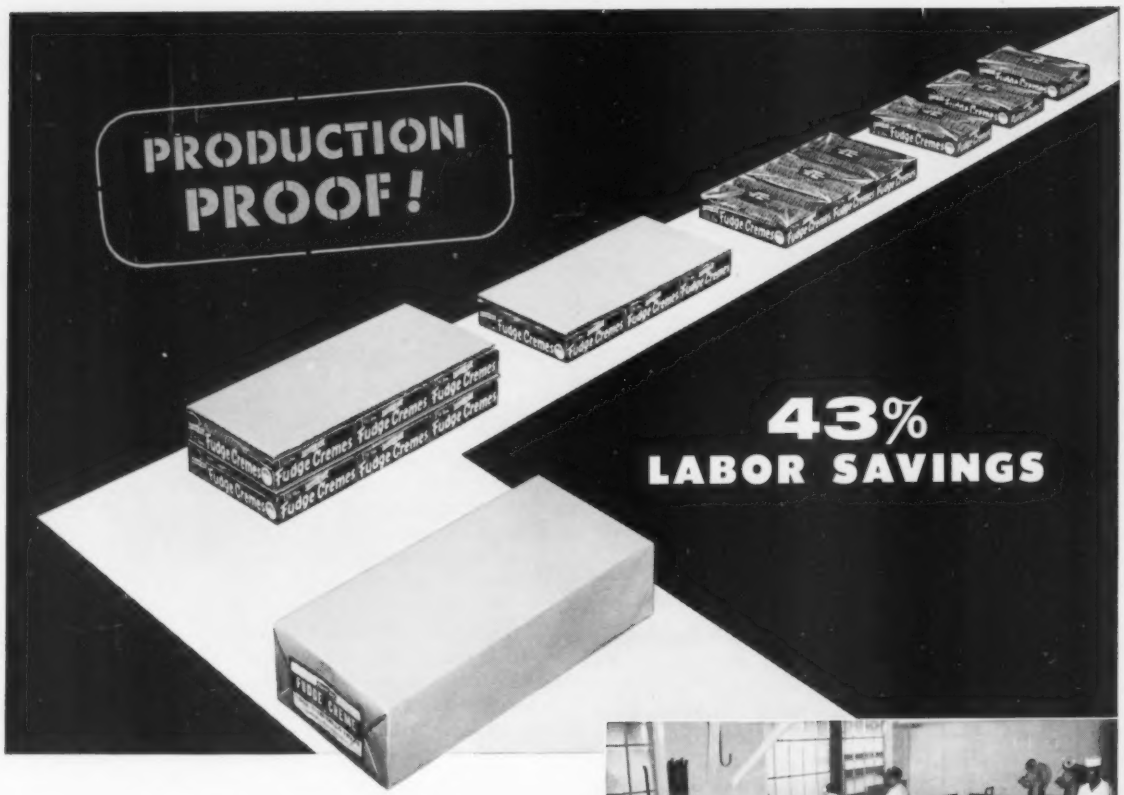
UNION BOXES

UNION BAG-CAMP PAPER Corporation

233 BROADWAY, NEW YORK 7, N. Y.

Factories: *Savannah, Ga., Trenton, N.J., Chicago, Ill., Lakeland, Fla., Spartanburg, N.C., Jamestown, N.C.*

Sales Offices: *Eastern Division—144 E. State Street, Trenton, N. J.*
Southern Division—P.O. Box 570, Savannah, Ga.; P.O. Box 454, Lakeland, Fla.
P.O. Box 1965, Spartanburg, N. C., Jamestown, N. C.
Western Division—4545 W. Palmer, Chicago, Ill.



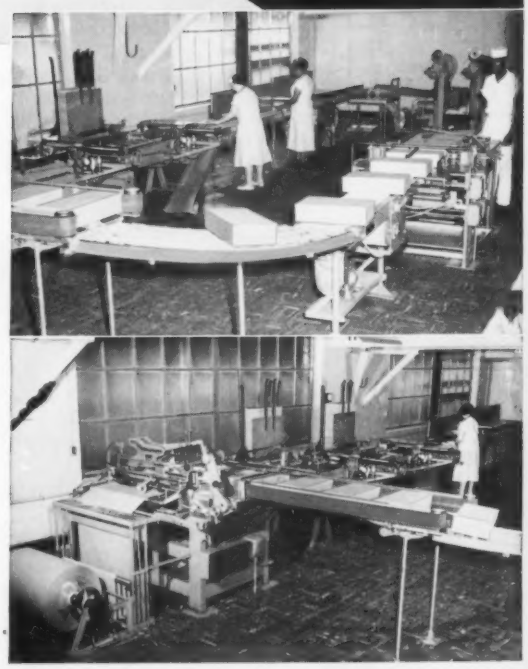
WITH HAYSSEN AUTOMATIC ACCUMULATOR AND BUNDLER

LABOR SAVINGS OF 43% are being reported by companies who have changed to the Hayssen system from the most efficient semi-automatic methods of accumulating and bundling.

MATERIAL SAVINGS OF 87% are being realized by users of modern Hayssen Accumulators and Bundlers who have replaced carton methods of packaging for shipping. Percentage is figured on cost difference between standard cardboard cartons and roll kraft paper. Check your carton costs against kraft paper at $0.002 per sq. ft.

FASTER OPERATION, just seconds from the start of the accumulating operation to the shipping room are reported by all users of Hayssen equipment — an especially important factor when handling ice cream and frozen food products.

BETTER PACKAGING claim all who have made the change. Hayssen wrapped bundles are tighter, neater and better sealed than was possible by older methods using gummed tape.



"The Hayssen accumulator and bundler has reduced our packaging labor requirements far below that which was needed by the semi-automatic system it replaced," reports Mr. W. Schneider, Chief Engineer of Schulze & Burch Biscuit Company. The equipment includes an accumulator, bundler and automatic labeler. The photos were taken in the firm's Chicago plant.

GET THE DETAILS Write for Bulletin No. 548 TODAY!

first in Automatic Packaging Since 1910

HAYSSEN

MANUFACTURING CO. • DEPT. PE-115 • SHEBOYGAN, WISCONSIN

Offices located in the following cities, check the yellow pages of your telephone directory: Atlanta • Boston • Chicago • Denver • Detroit Jackson, Miss. • Kansas City • Los Angeles • Minneapolis • New York • Philadelphia • St. Louis • San Francisco • Montreal • Toronto • Vancouver

For more information circle No. 217 on Reader Service Card, Page 89

Circle No. 218 on Card, Page 89

GAYLORD POINTS OUT
MANY WAYS YOU CAN SAVE IN PACKAGING

Gaylord uses a sharp pencil to survey your *total* packaging operation—checks those hidden costs that are frequently more important than the price of the box.

If you demand increased production, improved protection and important savings in corrugated packaging . . . call in your G-man. He'll help you erase any packaging errors, leave an indelible mark on the credit side of the ledger.

CROWN ZELLERBACH CORPORATION
GAYLORD CONTAINER DIVISION

Gaylord Boxes

IN CANADA • CROWN ZELLERBACH CANADA, LTD. VANCOUVER, B. C.

HEADQUARTERS, ST. LOUIS
PLANTS COAST TO COAST

175 MILLION POUNDS OF CRACKERS AND COOKIES PER YEAR!

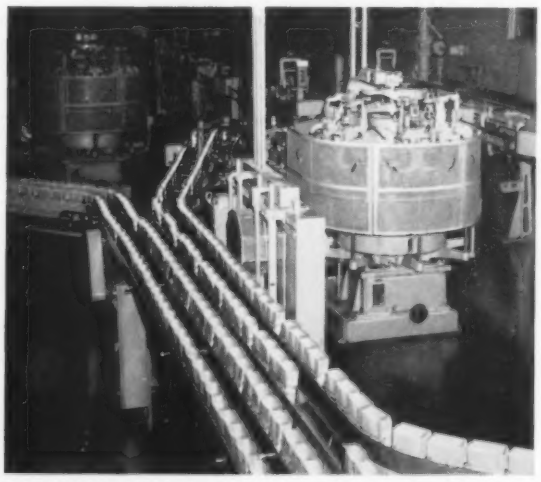
- Massive volume makes extraordinary demands on packaging equipment
- Pneumatic handles it in stride

Series of three Pneumatron weighers in operation at Nabisco's ultra modern plant at Fair Lawn, N. J.

You would find it rather difficult to locate a pantry in any American home that does not have at least one variety of NABISCO crackers or cookies "in stock" for demand orders by hungry children and adults alike.

These mouth-watering goodies are of many types and shapes – from animal crackers to pretzels, to delicate and tasty cocktail tidbits. Significant is the fact that NABISCO places heavy dependence on Pneumatic machines of various types to help take care of the enormous output of its battery of modern band ovens – each with a capacity of 700,000 crackers per hour. Core of the Pneumatic "line" is the Pneumatron units which see to it that every package gets its full measure – no more, no less. The remarkable accuracy of these weighing marvels is NABISCO's assurance of exact weight per package, in every package. Product freshness from oven to home is assured by the "double package" also produced by Pneumatic equipment. Top closing and sealing by Pneumatic finally make the package ready for the road.

To any producer of packaged or bottled products, Pneumatic's "lower cost per container" performance is more important today than ever before. Rising costs call for top efficiency. Better investigate what this type of protection can mean in your plant. We'll be happy to show you, any time you say the word.



Section of Nabisco animal cracker packaging line. Machines are Pneumatic Cyclo-Seal top closure units.

PNEUMATIC SCALE CORPORATION, LTD., 77 Newport Avenue, Quincy 71, Mass. Sales Offices: *New York; Chicago; Dallas; Rochester.* Agents: *Fred Todt Company at Los Angeles, San Francisco and Seattle. Rockwell Pneumatic Scale Ltd., Edgware Road, London, N. W. 2, England, O. R. M. A., Paris 8, France.* Subsidiaries: *Delamere & Williams Co., Ltd., Toronto; Carbert Manufacturing Co., Inc., Cambridge, Mass.*

★PNEUMATIC

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Circle No. 220 on Card, Page 89

BRIGHTER OUTLOOK FOR BULK PACKAGING

...MARLEX* Tailored Resin-101 for tougher, lighter, more economical bags

Chippewa and other leading manufacturers of heavy-duty bags are now making blown-tubing linear polyethylene bags from new MARLEX TR-101 resin. Stronger, tougher, more moisture resistant, and less expensive than low-density polyethylene bags for the same use . . . these new TR-101 bags offer attractive, more efficient, and less costly plastic packaging for bulk materials.

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*MARLEX is a trademark for Phillips family of olefin polymers

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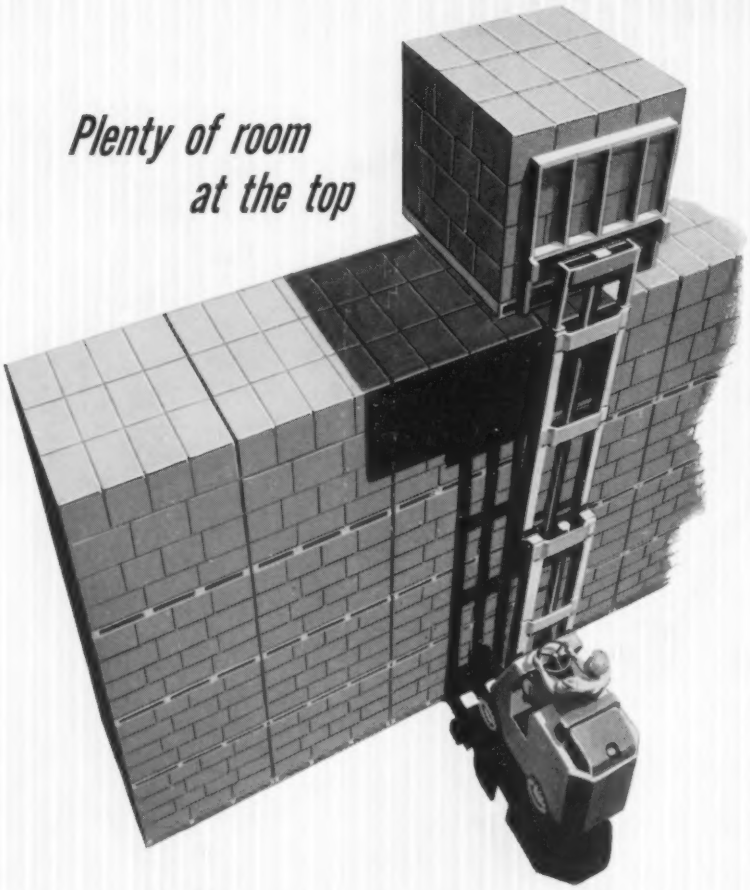

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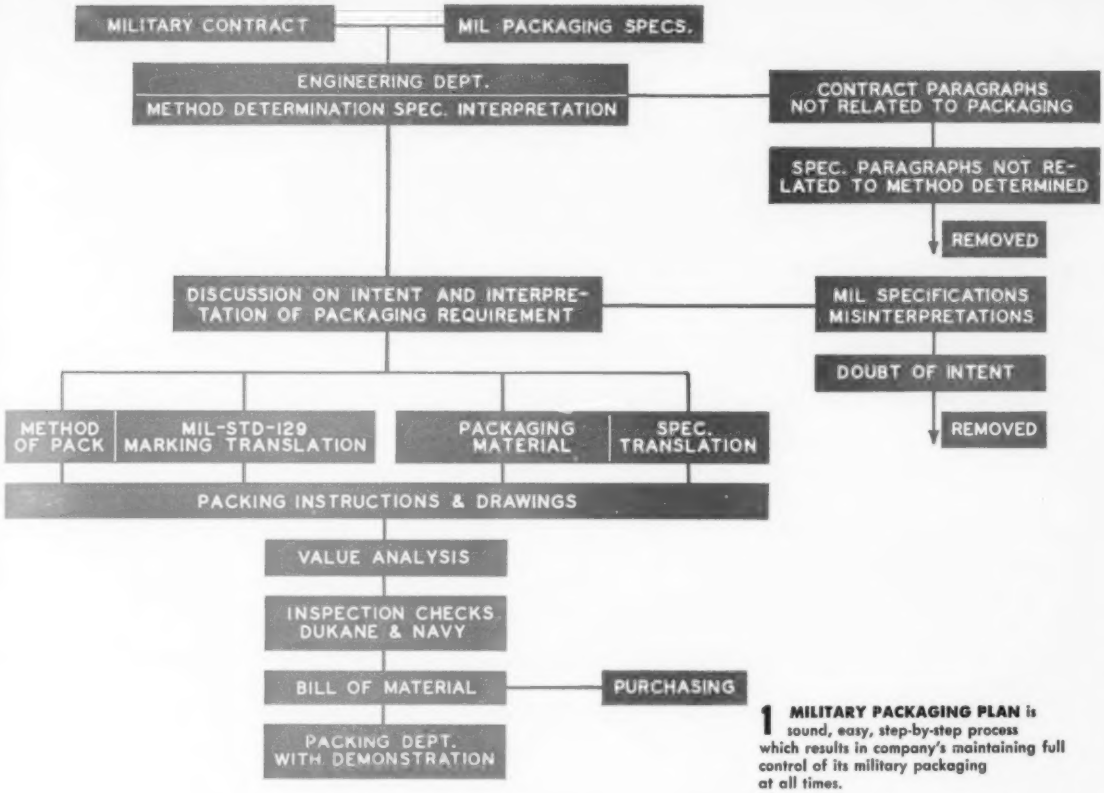


1 MILITARY PACKAGING PLAN is sound, easy, step-by-step process which results in company's maintaining full control of its military packaging at all times.

Have full control of military packaging

By Jack W. McNeil, *Project Engineer, DuKane Corporation, St. Charles, Illinois*

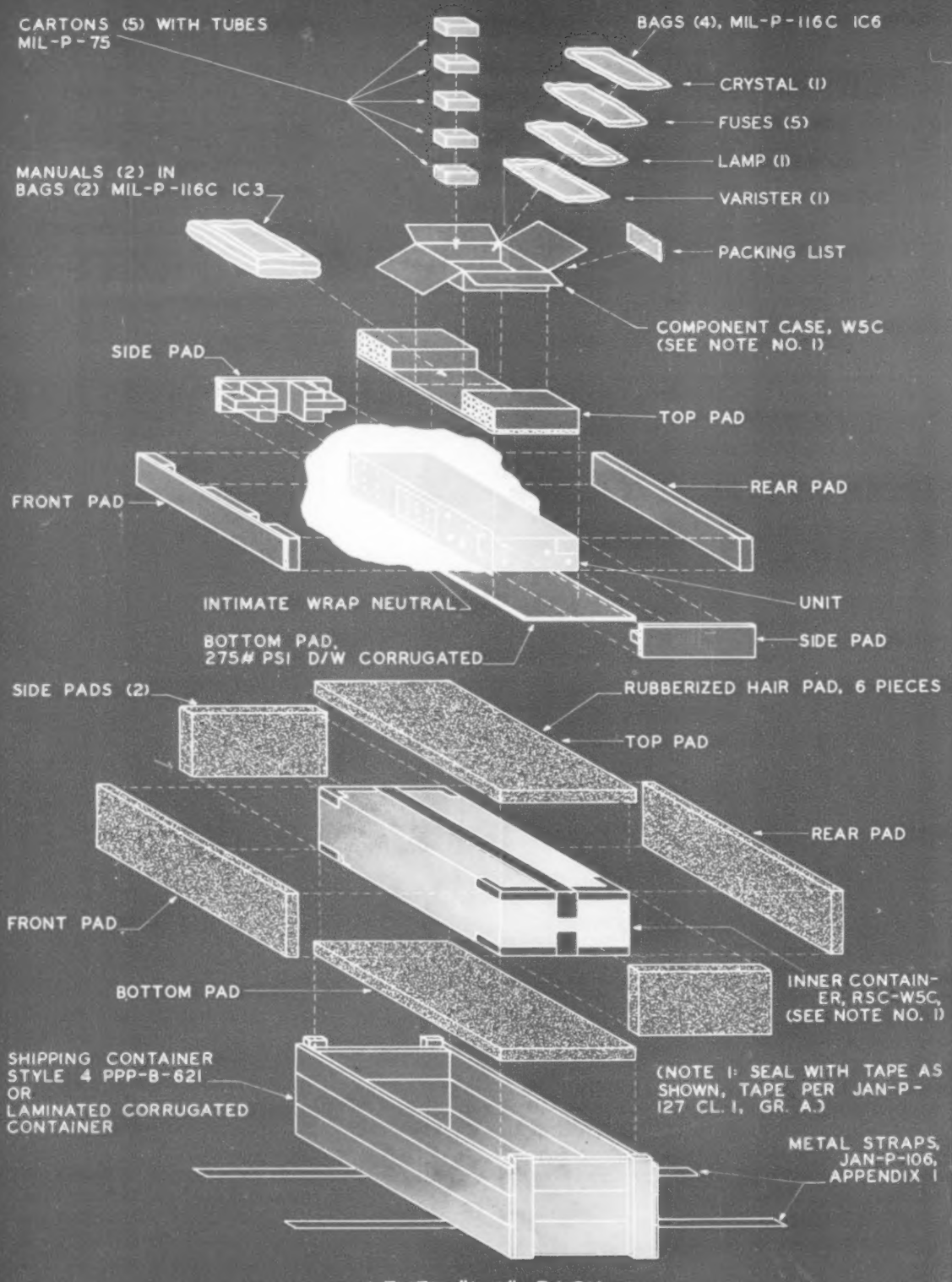
Recent studies show both the government and industry can save significant amounts of money by the intelligent use and interpretation of military packaging specifications. Important contracts have been won and lost simply by the contractor's understanding, or lack of understanding, of the important role played by proper packaging of products designed for the military.

Many companies have figuratively "lost their shirts" because of errors in estimating realistic costs for material and labor in complying with the requirements of MIL packaging specifications. A proper understanding of MIL packaging requirements is thus essential for full and complete industry-military cooperation and to assure maximum value for our tax dollar.

Packaging Overlooked

Most bidders know to the last detail the cost of products which are offered to the government. Unfortunately, too little importance is placed on the packaging of the item in accordance with the applicable military specifications. This is a big and potentially serious mistake. The cost of the packing material and labor must, of course, be added to the selling price of the equipment.

If the contractor estimates his packaging cost to be $2.00 per item, and later finds it to be $5.00 per item, he may be in real trouble if he is furnishing a relatively low priced unit. He may make no profit and quite possibly may suffer a financial loss on his government



— LEVEL "A-A" PACK —

FOR LEVEL "A-C" PACK: SAME AS ABOVE EXCEPT SUBSTITUTE CASE (RSC-275# PSI D/W PER LLL-B-631) FOR NAILED WOOD BOX. STEEL STRAP CASE SAME AS WOOD BOX.

contract since he is forced to comply with the specifications. Seldom is relief extended a contractor simply because of his unrealistic estimates of packaging costs. The government expects qualified bidders to accurately know packaging costs, just as well as they must know the cost of their product.

Pitfalls Of Overestimating

Other contractors pad their estimates with exorbitant packaging costs simply because of their inability, or unwillingness, to fully understand the appropriate specifications. Not infrequently the contractor may have an excellent product, and he may offer it at a competitive price; but because of his inexperience in the military packaging specifications field, he may be tempted to increase his packaging estimate as a protective measure. Thus, he puts his bid out of line with more experienced and sophisticated bidders, and subsequently loses the award and his opportunity for a profitable transaction.

We must realize that in a military item, the material, design, and labor in its packaging are just as much parts of the purchased item as are the assemblies and parts which make up the item itself. The military agency is not only buying the item, but it is also paying for its proper protection while in transit and storage.

Four Ways Of Approach

What can industry do in order to better understand military packaging and to make careful, realistic estimates of its costs?

1. Large industries can employ highly trained packaging engineers supported by a staff of experienced technicians. Training programs may be developed and initiated both inside and outside the plant. Separate military packaging departments may be established including specialized buyers and methods men. This is fine for the larger contractors with high dollar volume contracts with the government.

2. Smaller companies frequently throw themselves on the mercy of packaging material brokers who have trained their selling personnel in the most important phases of military packaging and who offer these men as packaging consultants to industry. Most are unquestionably reputable, but there are instances where military products have been greatly "overpackaged" in order to sell more material to the unsuspecting contractor with his first government contract.

3. Some companies depend solely upon organizations devoted to the business of packaging for both military and commercial end uses. Without question, their workmanship and methods are beyond criticism. At the same time, we must realize they are in business to sell their labor and materials.

The cost is frequently higher than if the work were performed in the contractor's own plant by its own specialized personnel. Control is lost and material handling costs of the product increase because of the extra transportation to the packaging house. Damage and loss can occur in transit, along with the handling of the item by packers who might be unfamiliar with certain delicate characteristics of the item.

In general, however, packaging houses are well justified if the contractor does not have the "know-how" to do an effective job within its own plant. Never lose sight of the fact that the contractor is selling labor, material, and skill as a part of its product, and it also has the opportunity to sell labor and "know-how" in the packaging of the product — if its staff will only properly plan for it.

4. Other medium-sized companies are now approaching the military packaging program in a way which allows them to maintain full control of the process and to do the kind of a job the government requires. This is done by assigning the military packaging responsibility to a government contract engineer as an additional function, along with his other highly specialized duties. In such instances, he is put in full control of making military packaging specifications work for both quotes and/or actual use. His knowledge of military products, as well as of the application of corollary military specifications, is his most valuable asset.

Traditional American reluctance to wrestle with fine print usually makes interpretation of military packaging specifications a formidable task. Unfortunately, ignoring them or trying short-cuts can prove disastrous, or at least expensive. Taking a realistic approach, Mr. McNeil shows that the key to correct application of a "spec" within one's own company is to prepare an articulate interpretation itself. His step-by-step approach not only warns one of the pitfalls of failing to heed military requirements, but also shows how to analyze a requirement, prepare an adequate set of drawings, write up a group of simplified work steps, and take full advantage of the help and cooperation available from the government people.

How DuKane Does It

Our company, a medium-sized electronics manufacturer, selected the latter method as the approach best suited to the military packaging problem.

The author was given the responsibility for military packaging, in addition to other duties, in 1954. It was anticipated this work would require from 15 to 25 per cent of my total time. We had previously depended upon our shipping and packing personnel's experience and the help of a packaging material broker to do military packaging.

In 1954, DuKane sent me to the Rossford Ordnance Depot, Toledo, Ohio, for an intensive four-week training program covering all phases of military packaging. The program was excellent. Along with others who had no previous knowledge of packaging, I received a packaging background on which to build a practical program within our own plant. The unromantic field of military packaging offered a challenge, with problems arising for solution—one by one. In 1958 and 1959, special industrial packaging courses were offered at the University of Wisconsin Engineering Institute. These two- and three-day courses offered additional opportunity to acquire more specialized knowledge. These Institutes, conducted annually, have been highly rated by experts in this specialized field.

Study The Contract

Here is our company's military packaging program in action, (see Fig. 1):

2 FINAL DRAWING after all details are worked out, is exploded view of entire pack which shows every packaging component to be used and precisely how all components are assembled to form complete, finished package. This drawing is valuable aid to packagers on packaging line.

We have just received a contract from the Navy Department to build, shall we say, 250 Widget Amplifiers. The Widget* is a complex, high-performance piece of electronic gear which requires good protection while being transported.

I may be assigned the job as project manager, responsible for the entire contract, or this function may be given to another project manager. In any event, the military packaging program remains my responsibility.

First, the contract is analyzed by my assistants, who incidentally also have other duties. With my assistants we then decide the method of packaging specified for the item. One of them will specialize in MIL-STD-129 marking, and getting the complete marking and packaging information to the packaging department in the most easily understood manner. Another assistant will set up a packaging bill of material, shipment schedule, expedite packaging material, prepare purchase requisitions, aid inspection and assist with satisfactory material storage.

Review Labor, Procurement

After we acquaint ourselves with the packaging intent of the contract, we meet briefly with our packaging foreman and a buyer from our purchasing department. All aspects of the labor and procurement problems are candidly discussed. We then begin the design and construction of a "tool." This "tool" then becomes the backbone of the packaging program for this contract.

We never take the easy way out by sending the contract and the related military packaging specifications to our packaging foreman for him to interpret and process. What to buy, and how to design, we think, are engineering functions, and the interpretation of the specifications unquestionably belongs in engineering, just as the technical specifications on building the electronic gear are part of the electronic engineer's responsibility.

Drawings Prove Helpful

To build the "tool," we take the assembly to be packed, or the final assembly drawings (if no actual model is available), and decide how we intend to cushion and block the item. Drawings are made giving the dimensions of the blocking and also showing a three-dimensional view of the material. The material from which the blocking, cushioning, and pads are made is indicated by using the MIL specifications, where applicable, as a reference.

We cannot overestimate the importance and utility of the "tool" we build. This is our interpretation of the specification packaging requirements—translated into practical terms our engineers and packers can follow. It not only lets them quickly and intelligently package the item in accord with requirements, but also serves as a helpful means by which our methods people may visualize the requirements and determine labor costs when making initial estimates for the contract.

From this step, using a MIL-P-116C, Method 1C-5, as an example of the method required, we then determine what other items and their method of packaging are to be included within the assembly package. Drawings for these small individual packs and their materials are also made, giving dimensions, material, etc.

Inner and outer cartons, as well as the shipping container, are then drawn and dimensioned. In fact, every piece of material, excluding tape, is shown on drawings and, where helpful, three-dimensional views are shown. The final drawing step is to show an exploded view of the entire pack to indicate how the pack is assembled. Fig. 2 illustrates this point.

Marking per MIL-STD-129 then is interpreted by making a drawing showing the actual location and text of the markings. This is done for each package and container. (See Fig. 3.)

Spell Out Instructions

After the above drawings are made, the step-by-step instructions are prepared with appropriate inspection procedures to be performed by our inspection team, and the resident Navy inspector. These instructions are written specifically for the packaging of the contract item, and referenced MIL-Specification authorities are indicated. At this point, we do a thorough value analysis. Where can we save on costs? Has the package been designed to make it simple and economical? Have all safe "time-savers" been used? If the answer is "yes," we proceed.

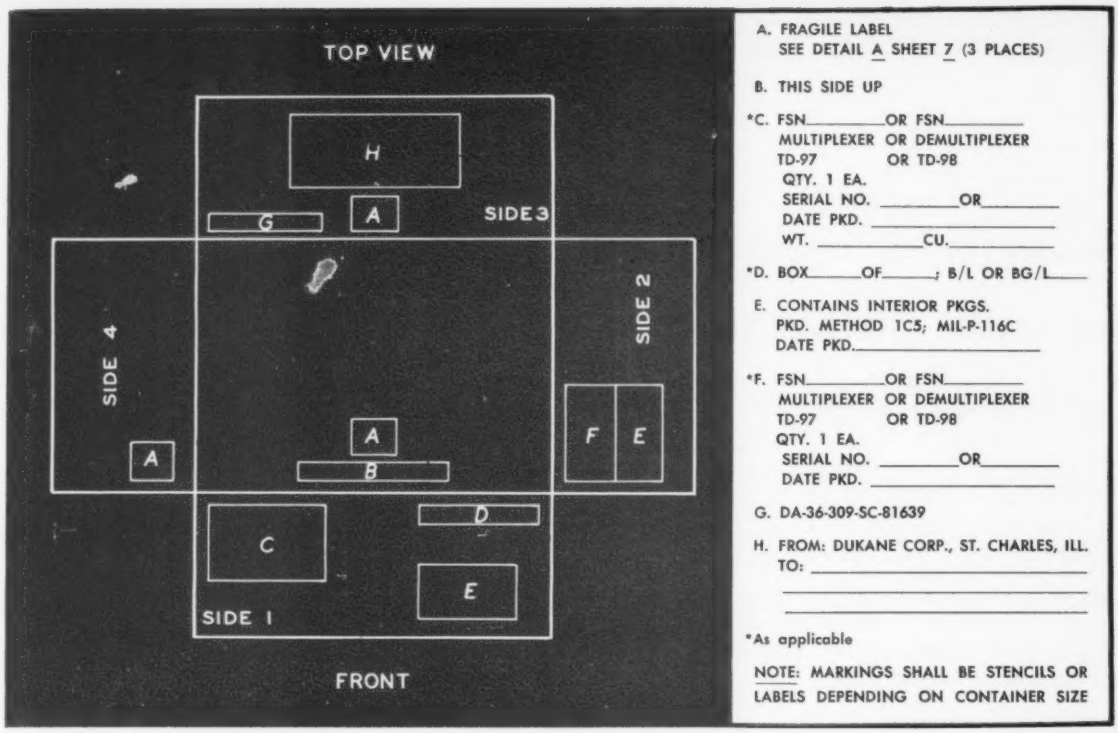
After my assistants and I have thoroughly checked the instructions (our new "tool"), we then invite comments, suggestions, and checking by our inspector and the Navy inspection office. When this has been done, we feel reasonably sure that we will not receive any rejects on method from these two inspection facilities if the packers carefully comply with our drawings. A bill of material is then sent to our purchasing department to procure the material. The "tool" has been made and will also be used by our inspection department and by the Navy inspectors as a guide.

Actually Try It Out

A "tool" is worthless unless an actual demonstration of its proper use is made. Those preparing it always demonstrate the proper practical interpretation of the instructions—how to make maximum use of materials, form, and techniques. As the contract progresses, they periodically spot check all labor-saving suggestions which develop from experience. This procedure often proves valuable in future packaging design. The process we use is shown in block form in Fig. 1.

For quoting, we follow the same process, but, of course, do not release the instructions unless we

*Fortunately, Mr. McNeil is able to write his article without describing the products being packaged. Since many of them involve hush-hush phases of some vital aspect of national security or defense equipment, it is enough in this article to call such an item a "widget" and merely state that it has to be packaged carefully.—Editor.



3 **MARKINGS PER MILITARY SPECIFICATIONS** are interpreted by making drawing which shows actual location and text of markings. Company has drawing like this for each package and container.

receive the award. We then save much valuable time by having the packaging material and process established if we are awarded the contract. This is somewhat unusual because most often items are built long before the packaging is determined. This frequently delays the shipment of important equipment to our armed forces, simply because the contractor did not follow an effective packaging plan.

Care Does Pay Off

You may ask, "Is all of this packaging detail really necessary?" We believe it is. While we naturally want to comply with the MIL packaging specifications, we go further if practical experience indicates it is necessary. Much costly material and engineering time can be ruined by improper packaging. Instructions for packaging an item such as an amplifier usually take us about two days to develop. Nothing is left unanswered and a simplified text for packaging is made. It is compiled from technical specifications and reduced to simple, easy-to-follow instructions. It has prior approval by our inspection facilities before being put into official use.

All procedures are carefully analyzed well in advance so no time is lost in discussing methods, etc., when the job is ready for packaging. Such procedure is thus both a training aid and a production aid as well. The packer then simply has to follow the instructions.

Plan For Changes

Normally, changes in personnel, either ours or Navy inspection, might lead to new interpretations of the contract and specifications, but this cannot happen when complete planned procedure and a bill of material have been documented and approved in advance. The packager gains confidence in knowing that, by simply following instructions, he is doing his job properly. There is no need for him to read the "fine print" in MIL packaging specifications. This has been done for him at a higher level by those fully responsible for the project.

Are there pitfalls? Certainly! Human nature unfortunately gives some people the urge to change procedures no matter how good they may be. This is possible, of course, even if there are specific

(*Continued on Page 93*)

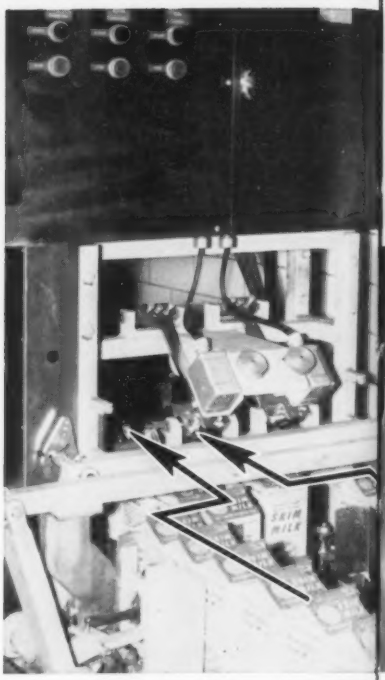
Jack W. McNeil was graduated from Northwestern University with a B.S. degree. After his discharge from the army, he took special courses at The University of Wisconsin in packaging and electrical engineering. Mr. McNeil joined DuKane Corporation in 1951 as project engineer. He is a member of American Management Association and American Rocket Society.

More automation for milk packaging!

Improved techniques in milk packaging raise efficiency, lower costs

Annual labor saving: $10,000
Virtually eliminates non-perfect waxed cartons

By Melvin L. Berg, *Production Superintendent, Superior-Dairy Fresh Milk Company, Minneapolis*



FILLED MILK CARTONS approach inspection machine in two columns about 1 ft. apart. Lead cartons of columns move toward each other to form two columns about 2 in. apart for intermittent movement through different inspection stations. (Arrows show travel direction.)

Increased efficiency in our ½-gal. milk bottling operation has resulted in an estimated annual saving of $10,000 in labor costs. In addition, we have virtually eliminated all chances of a non-perfect package reaching the consumer—including cartons which are poorly formed, not stapled properly (or no staple at all), underweight or overweight, and leakers.

Contributing to this increase is the recent installation of a completely automatic Thiele Engineering Co. inspection machine and case packer. A part of our overall program for automation of our packaging operation, the inspection machine rejects from the line any filled carton which is improperly stapled, has no staple, has a misshaped top, is underweight or overweight, or is not positioned correcly for feeding to the case packer.

The latter equipment places the cartons into wooden cases. This action is gentle and results in no damage to the individual cartons. Thus, no leakers.

Inspected By Operators Formerly

We have two Pure-Pak machines filling ½-gal. containers continuously. Formerly, an operator was stationed at the discharge end of each of these machines. His job was to inspect the cartons and pack nine of them per wooden case, arranged 3x3. In packing, it was easy for the operator to place the first two rows into the case reasonably gently. But the third row was more difficult, and there were times when the cartons of the last row would be dropped several inches, thus causing damage and leakage.

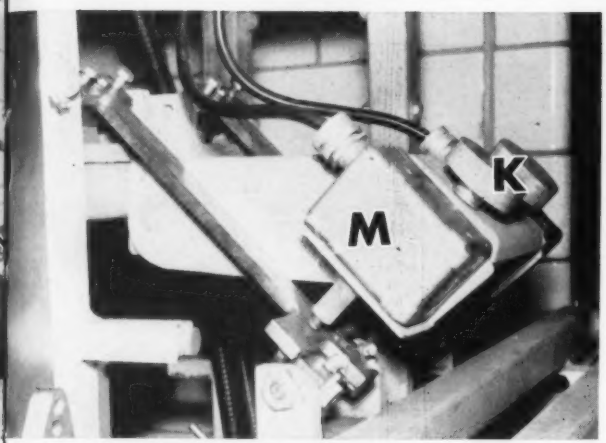
Also, at the same time, it was his job to inspect the cartons for missing staples or improper forming of the tops. In order for him to keep up with the filling machine, he could not do a thorough job of inspecting. As for proper weight, it was necessary to periodically remove a carton from the line and check it for contents.

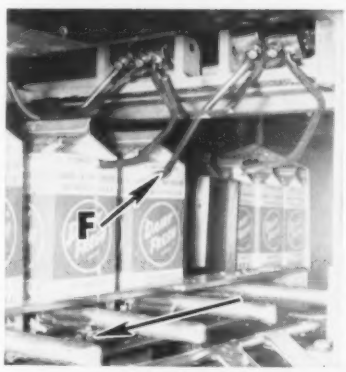
Frees One Operator

The new inspection machine and case packer handle all of the cartons coming from the fillers, each of which runs at a speed of about 34 cartons/min. Only one operator is required at the discharge end of the case packer to place the filled cases onto pallets. Thus, this arrangement has freed one operator for other important jobs in the plant.

Coming from each filling machine in single file, the cartons approach the inspection machine in two columns spaced about 1 ft. apart. The first operation the machine performs is to move the lead carton from each column sideways toward one another so that they are approximately 2 in. apart. Then they start traveling side by side

Improving package quality and increasing packaging line efficiency can be accomplished, and at the same time result in savings. Mr. Berg tells how his company, through more automation in bottling milk, has practically eliminated all chances of a non-perfect, waxed carton reaching a consumer; has raised production efficiency; and has resulted in a worthwhile financial saving.





SENSITIVITY OF SENSING MECHANISM for improperly formed cartons is controlled by knobs (K) which set Micro Switches (M) precisely. Switches transmit signal to "memory" wheel in control box when defective carton passes by.

"FEELER" ARMS (F), set for precise carton width, height, and position, check size of carton. If dimensions are outside 1/16-in. tolerance, or carton is positioned wrong for feeding to case packer, arms activate Micro Switch. (Arrow shows travel direction.)

through the inspection operation.

Has "Memory" Wheel

Moving forward intermittently, each carton passes under a set of feeler arms which "feel" the top and sides of the carton. These arms are set for a precise width and height. Should either of these dimensions be the least bit off (within a tolerance of 1/16 in.), the feeler arms activate a Micro Switch which in turn activates a pin on a memory wheel in the control box.

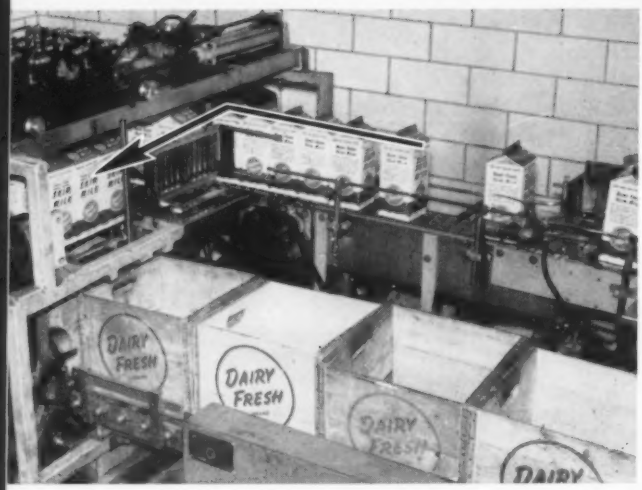
This wheel "remembers" which carton was not perfect and activates a lever which pushes the carton off the line. This latter action takes place three stations beyond where the imperfection is actually detected. At this feeling station, should a carton be turned 90° from the normal position for feeding the case packer, these feeler arms will detect this fact and register the information on the memory wheel.

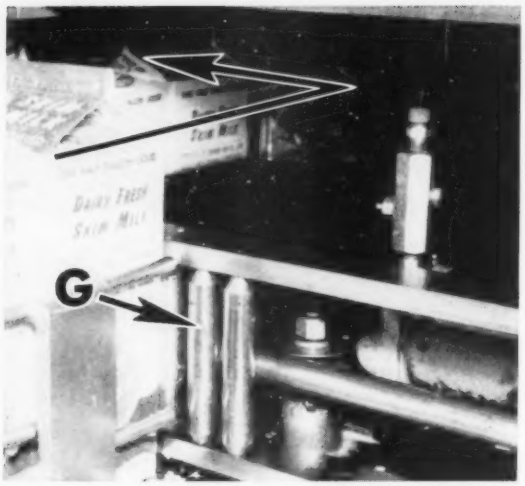
The next station contains an Avion scale for checking weight. The carton moves along to this station and, while it is at a momentary stop, the scale unit rises slightly to lift the carton off the conveyor platform so that it is resting entirely on the scale.

If the weight is correct and within tolerance, the carton will not be rejected (unless it has been rejected because of some other de-

SCALE (S) CHECKS WEIGHTS. Carton stops over scale which rises slightly, lifts carton free of conveyor. Electronic device records out-of-tolerance weight, registers fact on memory wheel. (Arrow shows travel direction.)

REJECTION STATION consists of vertical arm (A) which removes rejected carton from conveyor. As carton stops here, memory wheel activates arm if carton is not up to standards. (Arrow shows travel direction.)





CARTONS CHANGE TO SINGLE FILE and pass onto continuously running conveyor to case packer. Lead carton contacts Micro Switch at opposite side of packer, which causes pusher to move first three cartons sideways one carton width. Next group of three moves forward into place, is pushed sideways, and so on. Using rollers (G) instead of steel plates prevents scraping of wax. (Arrow shows travel direction.)

formation). If it is outside of the over- or underweight tolerance, the information is transferred from the scale through an electronic device to the same memory wheel as for the detection device previously, and the carton will ultimately be rejected.

The next station is the rejection station. As a carton comes to rest at this station, and if the memory wheel has received an impulse that the carton is not up to standards—improperly formed top, stapled incorrectly, no staple at all, over- or underweight, or positioned improperly—an arm moves outward and pushes the carton to the side as a reject. If the carton is all right in all respects, the arm remains immobile, and the carton is allowed to pass as approved.

Cartons Enter Case Packer

As each pair of cartons reaches the end of the inspection conveyor system, the two cartons are automatically changed into single file. They then pass onto an endless, continuously running conveyor chain which leads to the case packer.

Entering this equipment in single file groups of three, the lead carton contacts a Micro Switch when it reaches the opposite side of the packer. This switch activates an air cylinder which operates a pusher for moving the three cartons sideways so that the next column of three cartons can enter the packer. The face of the plunger is approximately 4 in. high and as wide as the total width of three cartons.

Has free-turning rollers as guides. Instead of flat, steel plates as guides which come in contact with the sides of the cartons, the machine is equipped with vertical, free-turning steel rollers. This feature eliminates any possibility of the wax being scraped off, scratched, or damaged in any way as the cartons are being handled by the case packer.

As the second row of three cartons is pushed sideways, it pushes the first row and so on. After the third row is accumulated and pushed into place, the 3x3 pattern is completed, and the nine cartons are ready to be placed into the wooden case. At this moment, another Micro Switch activates the rolling head of the packer, which places the cartons into the case. This latter switch is activated by the first row of cartons.

Rolling Head Carries Cartons

The rolling head contains nine pairs of serrated grippers which are postioned so that each is aligned over the uppermost protrusion on the respective carton below. Upon activation, these grippers close, grabbing the tops of the cartons tightly. At that instant, the rolling head, activated by an air cylinder, starts moving forward and carries the cartons over the case which has already been put into position to receive the cartons.

Carton bottoms are clear of table. So that the bottoms of the cartons clear the table on which they are resting after being accu-

Melvin L. Berg began his career in the creamery field in 1943 at Superior-Dairy Fresh Milk Co. After working in bottling, receiving, and processing, he became production superintendent. Mr. Berg is a member of the Minnesota Dairy Technology Society.

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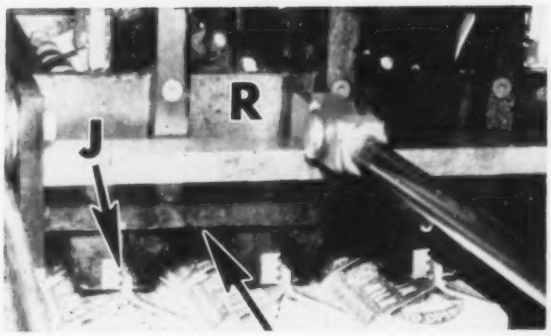
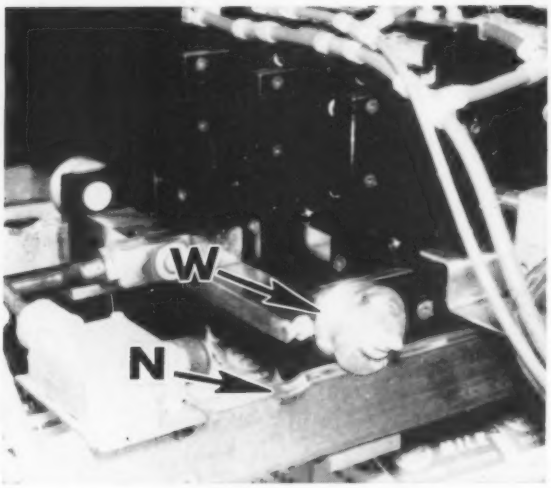


SERRATED JAWS (J), part of rolling-head (R) mechanism, grip tops of cartons tightly just before rolling head starts moving forward to position cartons over case waiting below. (Arrow shows travel direction.)

"SHOE HORNS" (H), mounted on framework which holds wooden case, guide cartons into case as case is lifted up around cartons.



ROLLING HEAD lifts cartons about 1/4 in. before it moves forward for casing operation. When head is at starting position, each wheel (W) is in its respective notch (N). As head starts moving forward, wheels are forced up and out of notches, thus causing lifting action.

mulated, the head lifts them up approximately ¼ in. just before it starts rolling for the casing operation. This lifting action is accomplished by notches in the tracks on which the head rolls. When the head is waiting for the cartons to be accumulated under it, each roller is resting in its respective notch. At the moment the head starts rolling, having grabbed the cartons, the rollers are forced up and out of the notches (by following the contour of the notches). This action lifts the entire head about ¼ in., which, in turn, lifts the cartons clear of the table.

"Shoe Horns" Guide Cartons

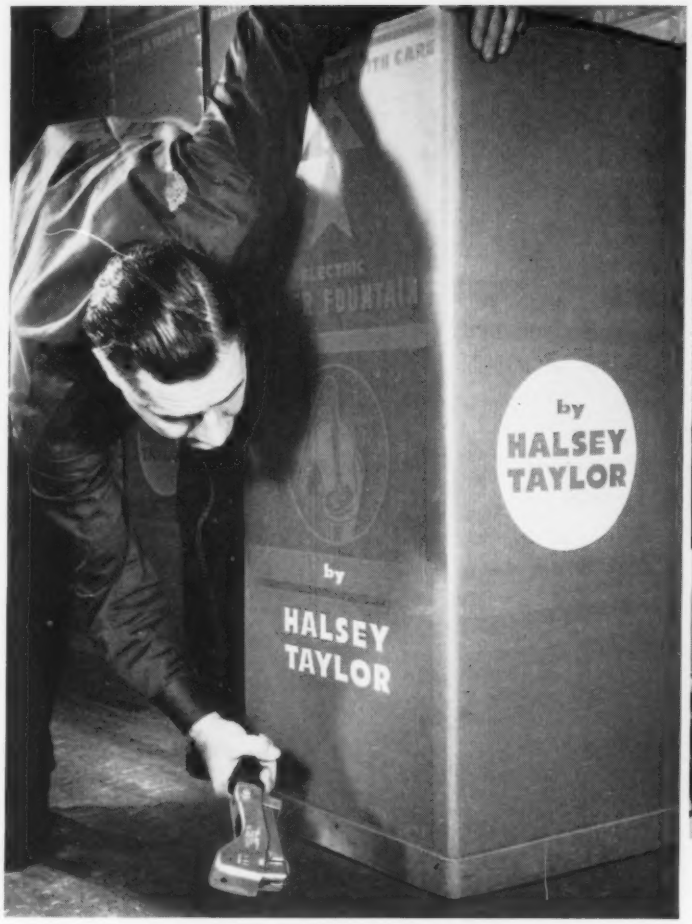
After the head has rolled into position over the packing station, a framework, which is holding a wooden case, rises to slip the case up around the cartons. As a foolproof means of having the cartons slide into the case with no difficulty, the frame contains a "shoehorn" arrangement. These "shoe horns" guide the cartons into the case.

When the bottom of the case is within about 1 in. of the bottoms of the cartons, the grippers on the head release the cartons which then slide gently down into the case. Although they have this 1-in. distance to drop, **they slide downward slowly due to the cushioning effect of air entrapped in the case under the cartons.**

At the instant the grippers release the cartons, the case is lowered onto the powered roller conveyor. Released from the frame, the case is carried by the conveyor to the palletizing operation. Simultaneously, after the grippers have released the cartons, the head rolls back to its starting position over the station where the next nine cartons are being accumulated.

Some of the foolproof operations are that the head will not grab any of the cartons until all nine are in place. After the head has picked up the cartons and moved over the case, it will not release any of the cartons until a case is in place and ready to receive the cartons. If a case should not be in place properly (for instance, only about half way), the head continues to hold the cartons, and if the next nine cartons have been accumulated, the machine will stop.

(*End*)



Packer staples carton to wooden pallet with Bostitch H4 Stapling Hammer. Staple legs diverge inside wood. Staples are coated to increase holding power 65%.

Bostitch Air-Driven Stapler securely seals top flaps from outside. Entire packing operation takes one minute with Bostitch stapling.

Bostitch stapling helps slash shipping costs— results in improved container

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European flexible packaging, plastics making notable gains

By Malcolm J. Odell, *Product Development Manager, Crocker, Burbank Papers Inc., Fitchburgh, Massachusetts*

Europe is changing, as every traveler during the last two years knows. Great economic strides have been made during the last ten years in the three principal countries visited, brought about and stimulated largely through the Marshall Plan and apparently being perpetuated by the Common Market and the so-called Outer Seven. Thoughtful European businessmen give full credit for the recovery to the United States. Everyone is in a hurry, an attribute no longer exclusively American. In the area of packaging, these changes are reflected particularly in flexible and plastics packaging.

European packaging is coming along fast. About the only advantage left to the United States seems to be volume, through long runs for the materials produced and automatic packaging lines for the user. But this appears to be temporary.

Many of the innovations, inventions, and new ideas in our field have European origin. The big contribution of the United States, perhaps, has been the rapid commercial development or exploitation of these ideas. The gap is closing. Certainly the new Russian economic offensive is compelling attention, but the resurgance of the economy of Western Europe is even more impressive. Packaging as an aspect of distribution is being seized upon as a sales as well as a handling tool by aggressive and creative European producers.

Films and other forms of plastic packaging are making real strides in Europe, according to Mr. Odell. His impressions and observations stem from a month's visit to England, France, and Western Germany. He scrutinized the recent International Plastics Exposition "Kunstoffe 1959" held in Dusseldorf, and he spent several days in London with plastics and packaging material producers and users—as well as with the Institute of Packaging.

Why are these things taking place so swiftly? Because the advent of the new trading blocks has opened an enlarged market for goods and services that, in total, must exceed that of the United States. Also, the lifting of trade barriers tends to put producers on a more even competitive level and makes national boundries less commercially important. The economists may not agree, but the evidence seems to be piling up.

Packaging Faces Bright Future

Specifically, where are the gains taking place? The outstanding places, to me, are in printed and flexible packaging, transparent packaging—both flexible and rigid—plastics, paper shipping sacks, and corrugated boxes. Without researching the statistics in these areas, it is apparent that all of Western Europe seems to be following the American pattern. Without studying the cause-and-effect relationships involved, we can say the big factor is the adoption of mass marketing, even though in infant form and under the handi-

EXTRUDED POLYETHYLENE NETTING is used for packaging produce, cheese, similar products.

cap of tradition and particularly of language.

There are problems to solve before "super marketing" even approaches development to its extent in the United States today. The biggest hurdle to overcome is lack of home refrigerated storage. We hear that only 9 per cent of the homes in England have refrigerators of any kind. West Germany may have more and certainly France has less, but refrigeration is coming everywhere. There is much concrete evidence that real demand backs this trend, and the packaging industry is betting on it. Industry, particularly plastics, is strongly back of this trend in consumer goods' merchandising and is on its toes with new materials and products.

Films

Polyethylene, nylon, polypropylene, and polyester film. Several sources of nylon and polypropylene film are available through European converters. Nylon and polypropylene have not found their way into any significant packaging applications as yet, though there is expectation of such uses for polypropylene.

Cook-in packaging is not the exclusive property of the United States. Use of polyethylene-coated polyester film for this purpose in Europe is evident.

Plastic Net Containers

Extruded polyethylene netting in tubular form is used for packaging produce, fruit, cheese, and bottled goods. Its advocates suggest it may compete with film in certain applications.

Tubes And Bags

Plastic tubes and polyethylene bags. Extruded PVC tubing is used for a wide variety of plastic collapsible tubes and unit packages for liquids and semi-liquids because of its strength, clarity, and ease of printing and heat sealing. Such products as produce, bacon, and hard candy are packaged in polyethylene bags. But, clear, so-called "cast" polyethylene film was not in use in any of the countries visited.

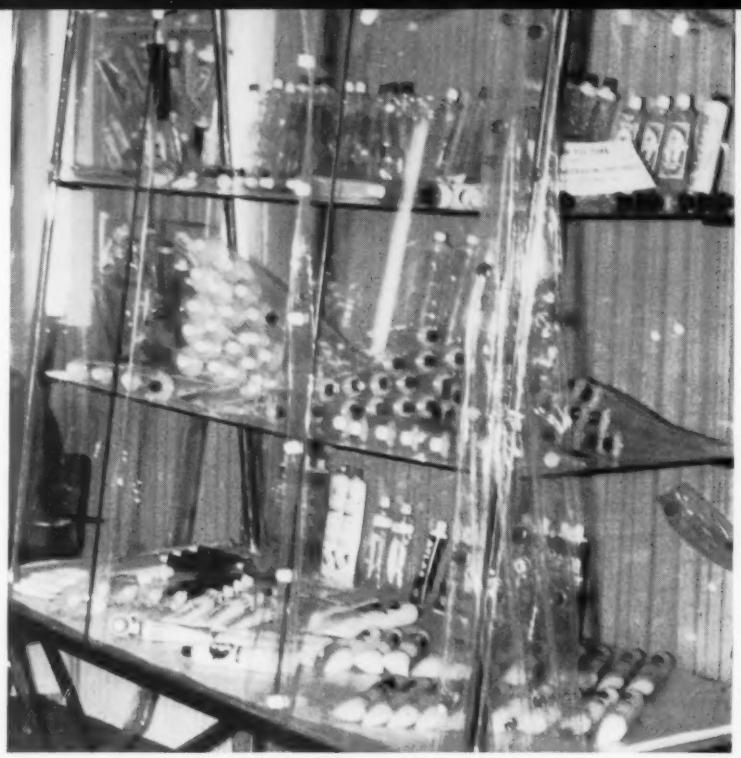
EXTRUDED PVC TUBES are used for liquids and semiliquids; POLYETHYLENE BAGS for bacon, hard candy, etc. So-called "cast" polyethylene was not in use in countries visited by author.

Plastic collapsible tubes, mainly of plasticized PVC, are widely used. One of these is a new type utilizing continuously filled tubing to which the closure spout has been heat sealed after the tubing is extruded. Individual tubes are made by heat sealing across the tubing, through the liquid contents adjacent to the closure. To open, the user unscrews the cap and pierces the tubing.

Conventional, individually extruded tubes are used, but the trend is to new designs employing continuous tubing. Sometimes the containers are heat sealed apart at an angle, making a self-contained spout for "one-shot" use.

Polyethylene inner liners for heavy-duty paper sacks. Unlike the United States, the use of extrusion-coated, inner-ply paper shipping sacks has not developed to any extent. However, containers are in use for shipping plastic resin granules, seeds, hygroscopic powders, and similar products requiring moisture protection, especially where odor or staining from an asphalt laminated barrier presents a problem.

Heavy-duty plastic bag for seed. A container holding approximately 50 lb. of rose seeds is made of clear



COLLAPSIBLE TUBES of plasticized PVC are made of continuously filled, extruded tubing to which closure spout is heat sealed. Sealing across tubing, through liquid contents, makes single tubes.

polyvinyl chloride film, approximately 0.008 in. thick. It supports a load (figuratively) of 3 long tons (metric) in stacking. Manufacturers claim wide-scale use of PVC film sacks, and at least three European sources exist today. No polyethylene heavy-duty sacks were shown at Dusseldorf.

POLYETHYLENE INNER LINERS for paper sacks, used for hygroscopic powders, seeds, etc.

Thermoformed polyethylene liners for drums, conforming exactly to the insides of rigid containers and yet having a wall thickness of less than 0.010 in. are available in West Germany, France, and the Benelux countries. These liners have the advantage over conventional tubular extruded polyethylene liners, as the contents do not become trapped in folds and wrinkles. They can be more easily cleaned free of contamination and thus offer possibilities for re-use.

Wide polyethylene film. In England and West Germany, extruders are producing and selling polyethylene film over 40 ft. in width. It is finding a number of uses there as in the United States, but is not yet as generally used as in the States.

Blown and molded plastic bottles and large liquid containers. Wartime shortages of metal led to the early development of techniques for using plastics as substitutes. This inevitably has led to a wide use of plastics as containers for liquids of all sorts. West Germany is perhaps still ahead of the United States in this type of package.

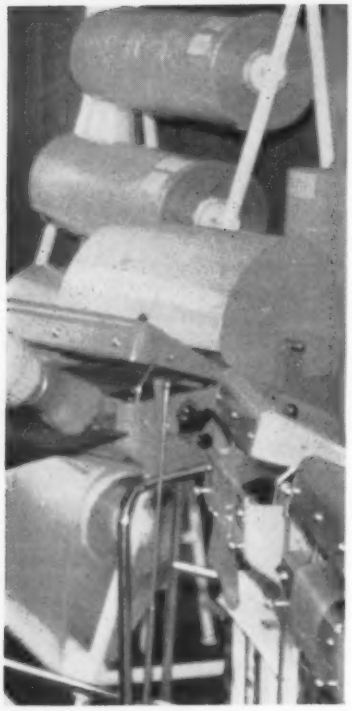
Machinery Developments

A new heat-sealing dispenser. Illustrative of foreign machinery development, an unusual machine dispenses polyethylene tubing, heat seals and cuts it to any desired length. The heat seal is automatically accomplished on one end as the material is cut, forming an open-end, bottom-sealed bag. The machine can be used for closing the container and trimming it after filling. It is operated by a foot treadle and has adjustable thermostats for controlling the seal.

Other new equipment for flexible film and plastic sheet packaging has been developed. Heat-sealing and vacuum-forming equipment developments encompass a variety of new machines. Alfred Schwalbach KG. of Hamburg displayed a line of both types. Its Minitherm heat-sealing appliances allow sealing of prepackaged flexible packages of any shape and size to be made.

This equipment is also useful for custom packaging, since plastic film can be sealed to itself without an undersupport, except for the contents of the package. Its vacuum-forming units also permit deeper than usual drawing by mechanical

BLOWN, MOLDED PLASTIC BOTTLES, developed in wartime metal shortage, hold liquids.



AUTOMATIC MACHINE dispenses polyethylene tubing, makes bag; seals it after filling.

Malcolm J. Odell attended the U. S. Naval Academy and Evanston Academy of Design. Since 1935 he has been connected with the technical, marketing, and engineering aspects of packaging. He was vice president in charge of research, development and engineering at the Angier Corporation, and general manager of the plastics division of Ludlow Papers, Inc. During World War II, he headed the U. S. Army packaging activities, and spent the last year of the war as chief of packaging for the European Theatre of Operations. Mr. Odell is a member of American Society of Mechanical Engineers, The American Ordnance Association, Society of Packaging and Handling Engineers, Technical Association of the Pulp and Paper Industry, National Security Industrial Association, and paper products committee of the National Research Council, and is a professional member of Packaging Institute.

stretching and blowing techniques.

A Polyethylene Coating

Another new product is powdered dispersible polyethylene produced in a form suitable for use as a versatile coating. The product, Coathylene,* can be dispersed in a water or solvent system and applied to flexible substrates such as paper, paperboard, or cloth, or to rigid bases such as metal or glass. After drying, it is heat-fused to form a semicontinuous protective polyethylene film.

The granule size ranges from 1 to 300 μ, and various formulations of polyethylene, both natural and colored, are used depending on the desired character of the coating. Coating viscosities varying from heavy pastes to thin liquids can be made suitable for knife, reverse-roll, or spray application, according to its developer, Techno-Plast-Spindler S.A. of Fribourg, Switzerland. *(End)*

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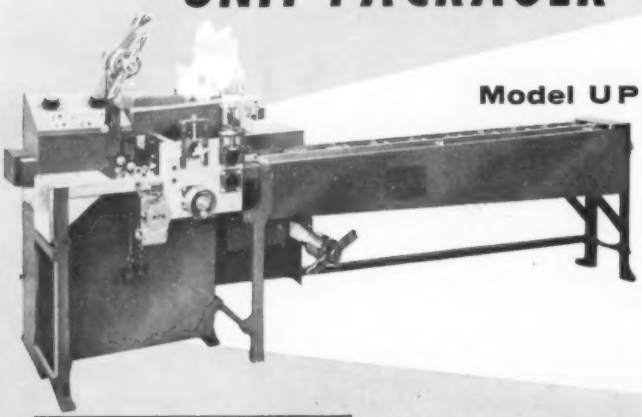

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Simplified answer to a skin-packaging problem

Hard-to-package saw blades required a package that would combine the advantages of visible product display for self-service merchandising with adequate product protection and manufacturing economy. The solution: a skin package of P.O.M.V. film, (Polyethylene-on-Mylar®-Vacuumized) was developed by Print-A-Tube Co., Paterson, N. J., for Chicago Saws, Inc., Chicago, Ill.

A coating of ALATHON 16 on MYLAR* polyester film provides a tough, notch-resistant package and permits the film to be sealed directly to the board, eliminating the necessity of coating or perforating the board.

Perhaps your needs, too, could best be served by one of the formulations of ALATHON available for coating on films, foil or paper. The coupon below will bring you further information.

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Package development is an important activity if we expect a given package to be functionally correct. Mr. Major asserts that it is up to the user company to conduct necessary tests to determine the proper package. In a step-by-step discussion of package development, he points out a definite separation of its mission, function, and actual laboratory development work. This first part of a two-part article includes what you must know about the product, researching for the proper packaging material, testing specifications, among other pointers for developing a package.

Package development pays off!

By Bernard F. Major, *Manager, Packaging Laboratory and Receiving and Stores Division, Ortho Pharmaceutical Corporation, Raritan, New Jersey*

Satisfactory functional packages require intensive study and investigation for their creation. They do not appear spontaneously. Somebody must conduct the necessary studies and test the resulting packages to insure their functional suitability for their intended use. We call this activity "package development," and we suggest that the company to use the package can best do it. Whether a single individual or a group does this work, the function is package development. A section, a division, or even a department may carry it out.

The mission of any package development group usually requires that it:

1. Keep abreast of the characteristics of:
   a. All available packaging materials and components;
   b. Methods of manufacture of packaging components;
   c. All available packaging equipment.
2. Develop new components or package changes quickly and efficiently.
3. Test or otherwise determine the adequacy of packaging materials or components under consideration.
4. Write adequate package or packaging specifications.
5. Set up appropriate controls for inspecting:
   a. Incoming package components;
   b. Newly adopted packages or packaging methods;
   c. Returned goods.

Package development requires a place to work with adequate facilities for doing its job, and adequate definitions by management of its duties and functions. The facilities required will largely depend on what is expected of package development and what help its people may get from other departments in the company. Facilities for package development involve both laboratory and office work.

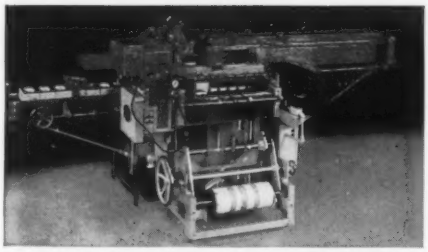
What Package Development Does

The functions of package development include:

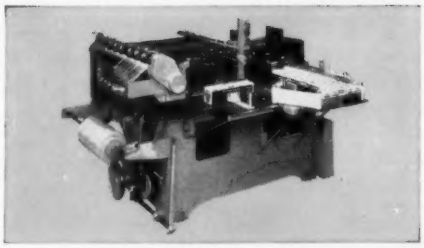
1. **Assembling** of information about products to be packaged and their packaging requirements.
2. **Research,** especially into methods of fabricating components into finished packages.
3. **Engineering** of packages.
4. **Development** of packages.
5. **Testing** the adequacy of proposed packages.
6. **Writing** of adequate specifications for packaging materials, components, and methods.
7. **Inspection of incoming packaging** supplies and components.
8. **Inspection of the packages of goods returned** for any reason whatever.

Before describing how package development work is carried out, it is important that we delve into what it involves and why. By knowing all this, the package development man or team may be able to

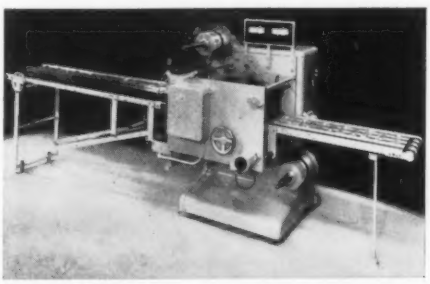
Bernard F. Major has been associated with Ortho for 14 years. Previously, he was employed by the Phelps Dodge Company and the E. I. du Pont de Nemours and Company (Inc.). He attended Syracuse University and is presently in his senior year at Rutgers University working toward a B. S. degree in marketing. A professional member of the Packaging Institute, he serves on the Drug and Pharmaceutical committee.



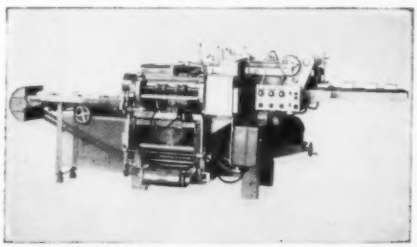
NOW YOU CAN HAVE TOMORROW'S OVER-WRAPPING MACHINE TODAY! Battle Creek's completely new Model 475 successfully handles more than 40 different formulations of soft plastic film . . . your assurance new plastic film developments will not outdate this machine. Change of films requires only electronic heat adjustment. Size changes are made in 15 minutes. Wraps up to 75 per minute within 5" to 12" lengths, 3" to 8½" widths and ¼" to 4" heights. Choose any of these films — polyethylene (medium, low and high density 1 mil and up), polystyrenes, heat sealing cellulose acetates, heat sealing foils, polyvinyl chlorides, cellophanes, polypropylenes or polymer coated films. **Battle Creek *"Continuous Flow"* Packaging Machines, Inc., Battle Creek, Michigan.**



REDUCE COSTS . . . PROTECT PRODUCTS . . . IMPROVE DISPLAYS . . . PROMOTE MULTIPLE SALES with Battle Creek's new Model 850 Automatic Bundler. This machine bundles groups of packages . . . 4, 6, 8, 12 and 24 to a bundle . . . at speeds up to 18 per minute. Depending on construction selected, the machine bundles with kraft paper, polyethylene, cellophane and other films; in bundles within 5" to 12" long, 4" to 10" wide and 1" to 8" high. Used for textiles, paper items, drugs, chemicals, cosmetics, food products . . . and/or what have you? **Battle Creek *"Continuous Flow"* Packaging Machines, Inc., Battle Creek, Michigan.**



CHANGE PACKAGE SIZES WITHOUT EXCESSIVE DOWNTIME! Handwheel controls for varying the pouch width, and a simple gear change for varying pouch length, — both made without disturbing the heat-sealing units — provide almost instant adjustability. Thin articles (not necessarily uniform in shape) are pouch packaged between two endless strips of heat-sealing packaging materials at speeds up to 80 per minute. Pouch sizes range from a minimum of 2" x 2" x 1/16" to 27" x 15" x 1½" maximum. The "Flexopaker" is especially applicable for articles in the textile, food, automotive parts, industrial products, hardware or similar industries. High speed "Continuous Flow" performance but with a low price tag. **Battle Creek *"Continuous Flow"* Packaging Machines, Inc., Battle Creek, Michigan.**



THE SOLUTION TO WRAPPING FRAGILE BAKED GOODS . . . QUICKLY, SAFELY! Battle Creek's Model 43L has been designed specifically for the bakery with the problem of packaging small bakery products . . . such as cookies, iced cupcakes, turnovers and pastries. A machine capable of wrapping from 40 to 70 packages per minute, the Model 43L handles each package gently, smoothly and quickly. Package sizes may vary from 3" x 1¾" x ½" to 10" x 4½" x 4". Wrapping material may be printed or unprinted cellophane, with or without separate top labels. Each package is a miniature bakery "showcase." **Battle Creek *"Continuous Flow"* Packaging Machines, Inc., Battle Creek, Michigan.**

TO: PACKAGE DEVELOPMENT LABORATORY WORK ORDER NO._____
REQUESTED BY_____ IF URGENT DEADLINE_____
SUBJECT_____ DATE_____

Please indicate request below

1. Does this concern:

(a) A complete package	(b) A specific package
☐ Clinical	☐ Material
☐ Government	☐ Method of manufacture
☐ Export	☐ Idea
☐ Domestic	☐ Device
☐ Sample	☐ Equipment
☐ Promotional	☐ Color
☐ Bulk	☐ Copy
☐ Affiliate	☐ Other (Explain)
☐ Competitive	_____

2. Does this concern:

(a) A complete service	(b) A specific service
☐ Investigation	☐ Mock up
☐ Development	☐ Proof reading
☐ Change	☐ Information
☐ Problem (Solve)	☐ Display
☐ Survey	☐ Presentation
	☐ Other (Explain)
	_____

3. Further information or clarification:

_____

_____

_____

_____

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_____

_____

FOR LABORATORY USE ONLY SERVICES CHARGED	
Research:	
Exploration	
Evaluation	
Engineering:	
Creation	
Design	
Function	
Improvement	
Testing:	
Product requirements	
Package	
Shipping	
In use	
Specifications:	
Material	
Design	
Dimension	
Finish	
Inspection:	
First receipt	
First production	
Field survey	
Returned goods	
Nonprofessional: (Explain)	
_____	
TOTAL TIME	

Date completed_____

Comments:_____

_____

_____

1 AN AID IN PLANNING AND SCHEDULING, request is for laboratory work and tells package development people, at a glance, intent of project, can make solution of problem simpler.

take short cuts and thereby minimize the effort and expense of finding a suitable package.

Packaging Requirements

Assembling complete information about the packaging requirements of a product is the indispensable first step in package development work. If other departments of the company cannot furnish the required information, package development must find it by itself. The vital information includes:

1. **Physical and chemical characteristics** of the product.
2. **Detailed description** of the uses of the product.
3. **Size of the packages,** i.e., quantities of net contents, including dosage if it is a pharmaceutical product.
4. **Predicted volume** to be produced.
5. **Existing packaging facilities** that can be used for packaging this product.
6. **Channel of distribution.**
7. **Promotional requirements.**
8. **Legal requirements.**
9. **Medical or pharmacological requirements** (for pharmaceutical products).
10. **Cost** that the product can carry.
11. **Needed convenience features** for benefit of consumers.

Develop Information

The information entailed in the preceding tabulation becomes voluminous and requires much thought preceding its collection. A complete checklist covering every possible eventuality would be so large as to be impractical. Requirements vary too much from product to product, and requirements for a given product may change because of a change in the system of distribution, or a change in the area of distribution that embodies a significant change in environmental factors.

Nevertheless, once the package development people assemble and digest all the data regarding the requirements, it is relatively simple to develop the proper package. Usually, the real difficulties arise when part of the needed information is lacking.

Research

Investigation of the need for a specific type of packaging material is sometimes necessary, especially when existing information is inadequate. While you sometimes want scientific research of this type, it is more common for you to need technological and engineering research, and plain ordinary digging for information into new fabricating methods or improvements of old methods.

While research for information last mentioned may not be regarded as research in its scientific sense, it is still very important in package development work. It would be costly and perhaps very embarassing to package, promote, and distribute a product only to discover shortly thereafter that you might have used better methods which were available, though unknown, to the package development people at the time the work was being done.

To keep up to date on the flood of new improvements, the package development group must follow many periodicals and, above all, maintain contact with suppliers. Isolation or insulation of package development people from such

PRODUCT DATA

SUBJECT _____

DATE _____ BY _____

	Yes/No	Index Of Failure: Gain/High	Index Of Failure: Loss/Low	Descriptive Answer
For Material				
Compatibility				
pH				
pH attained by (type acid)				
Free oil or liquid				
Base (solvent, oil, aqueous, etc.)				
Ingredients				
Special Processing				
Method (vacuum, gas, hermetic, sterile)				
Surrounding conditions special (dustless, heat, etc.)				
Protection				
Light (maximum endurance)				
Temperature				
Humidity endurance (moisture loss or gain)				
Atmospheric pressure (maximum decrease)				
Oxidation (maximum endurance loss or gain)				
Grease (or fat) loss				
Aroma				
Flavor				
CO_2				
Insect				
Mold				
Bacteria				
Desired shelf life				
For Design				
Container				
Shape				
Size				
Hardness				
Type product (therapeutic, diagnostic, vaccine, etc.)				
Market (vet. retail, lab. reagent, etc.)				
Dispenser				
Flow (density, fineness, viscosity, etc.)				
Administrated (oral, rectal, topical, etc.)				
Dosage per unit container (single or multiple?)				
Any Unusual Characteristic (explain)				

2 **PRODUCT DATA** is information necessary for pre-selection of packaging materials. With increased knowledge of requirements, selection of materials narrows down proportionately.

sources of supply and their knowledge is a great mistake.

In cases involving new liner materials or new plastic structures, information of the desired sort may be so restricted to a particular supplier that only this supplier can do such research—in cooperation with the user company's package development people, but in the supplier's laboratory.

Need For Speed

Today's competition is stimulating more and more companies to come up with developments that make their own packages obsolete. The time required to develop a different package, market-test it, and finally get it into production is so long that you simply cannot risk a surprise move by a competitor before starting to develop your own "surprise" for your competition.

In this endeavor, ideas and their development are usually a joint effort in which our own salesmen, market researchers, and consultants will contribute to the work of the package development department. Every now and then a patentable development emerges from this joint effort.

Testing

Two sorts of tests are carried out by package development. First, we seek the verification of performance claims made about some packaging material. We want to be sure that the material actually possesses the attributes or characteristics, and to the quantitative extent claimed, before going on to fabricate and test experimental packages.

It takes a lot of labor and facilities to produce packages, and, if the tests of completed packages proved unsatisfactory, there would always be considerable doubt as to whether the material was at fault or the fabrication defective. Thus we always eliminate that variable by testing the material itself.

A second kind of testing is determining the adequacy of a proposed package to withstand the rigors of distribution as well as protect the contents from environmental hazards in various areas.

Specifications

As soon as a package wins approval by the appropriate individuals, and its production is authorized, it then becomes necessary to prepare complete specifications

New

INFEED TIMING SCREWS INCREASE PRODUCTION LINE SPEEDS

Even unstable containers can now be fed with smoother acceleration using the new Kinsley Timing Screw. These screws are generated to fit each specific application. Feed practically any type containers at as much as 30% higher speed without shock and discharge them at required spacing. Used on fillers, cappers, labelers, washers, etc. Made of non-marking, tough Formica. Ask to see our representative.

COLTON

Arthur Colton Company

3400 E. Lafayette • Detroit 7, Mich.

The case of the triskaidekaphobic engineer

FEARLESS FULLER: I finished off a very interesting case over the weekend, Miss Watson.

MISS WATSON: Let's hear about it, Fearless.

FEARLESS FULLER: It concerns a good prospect who agreed our adhesives were best, our service was best and our price was best. Yet he wouldn't order.

MISS WATSON: A baffling mystery.

FEARLESS FULLER: Yes, until I discovered the reason for his actions. The man suffers from triskaidekaphobia.

MISS WATSON: Sounds like a horrible disease.

FEARLESS FULLER: Not in the least. Actually all it means is fear of the number 13. Many people are triskaidekaphobics.

MISS WATSON: That must be what my hillbilly cousin was. He refused to sleep 13 in a bed. But what has triskaidekaphobia got to do with us?

FEARLESS FULLER: Well, this engineer's been reading our ads and noted that we always list 13 Fuller Plants. And for this reason he refused to order from us.

MISS WATSON: How did you solve the case?

FEARLESS FULLER: I explained that although we list 13 plants, these are only our main plants. Actually, Fuller has additional locations, 23 to be exact.

MISS WATSON: Well, did you sign him up for a big order?

FEARLESS FULLER: Naturally.

MISS WATSON: Oh, you're wonderful, Fearless!

FEARLESS FULLER: Elementary, Miss Watson. There are very few problems a Fuller man can't solve.

Your Fuller man is ready with the correct solutions on any adhesive problems for you, too. Contact your near by plant.

H. B. Fuller Co.

INDUSTRIAL ADHESIVES

St. Paul, Minnesota

St. Paul, Minn. • Atlanta, Ga. • Buffalo, N.Y. • Chicago, Ill. • Cincinnati, Ohio Dallas, Tex. • Kansas City, Mo. • Linden, N.J. • Los Angeles, Calif. • Memphis, Tenn. • Portland, Ore. • So. San Francisco, Calif. • Tampa, Fla. Also Winnipeg, Can. • Fuller Adhesives International, Nassau, Bahamas

For more information circle No. 233 on Reader Service Card, Page 89

for every material and component going into its makeup. In plants where no package development departments exists, it happens all too often that specification writing falls by default to the purchasing department.

Yet purchasing may or may not have all necessary information. As packaging line speeds increase, there is a corresponding need for more exacting specifications and closer tolerances. Purchasing people have enough to do without writing specifications for packages and their components.

Complete and detailed specifications are necessary for each component of a package. These specifications normally include:

1. **Dimensional** specifications including the necessary drawings.
2. **Material** characteristics.
3. **Performance** standards.
4. **Packing and shipping** the components.
5. **Printing,** including color spec's.
6. **Manufacturing** quality.

When new specifications are approved and adopted, then you must make enough copies to distribute to suppliers, interested individuals in the company, especially purchasing, and to each affiliated company.

Inspection

Each time you purchase and receive a package component, you should inspect it to insure that it meets specifications. Through the use of statistical sampling plans, it is possible to select a representative sample, and from it, predict the quality level of the entire shipment without inspecting 100 per cent of the items.

When a specification has not been met, the entire shipment or a part of it may be returned to the supplier according to the type and extent of the defect. Under the system we use, the supplier is informed of any deviation we may find, even if it is only a minor variation.

Inspection does not stop here, however. It is important to follow the first delivery of anything

Memo to—an ENGINEER

with a lively curiosity about packaging

You are around 30, you probably have a degree in mechanical (but perhaps in industrial engineering, and you have the knack of delving into packaging problems.

Your present work may be (but not necessarily) on the production lines of some package-using company. Or you may be a technical service specialist for a packaging machinery builder or a supplier of packaging materials.

You want the challenge of a position that will let you do some traveling and dig even more deeply into packaging problems. And you want to be home-based in the Chicago area. If so, you may be the man we want.

Our employees know of this ad.

Write a letter, in complete confidence, outlining your education, experience and background to:

Dept. ED 260
PACKAGE ENGINEERING
185 N. Wabash Avenue
Chicago 1, Illinois

There's a Fuller Plant near you

PLANT LOCATIONS

ST. PAUL, MINNESOTA
1144 Eustis St.
Phone: MI 6-8641
G. L. Ryberg, Mgr.

ATLANTA, GEORGIA
655 Mead Street S.E.
Phone: MA 7-1939
W. R. Mattox, Mgr.

BUFFALO, NEW YORK
1934 Elmwood Avenue
Phone: RIV 6366
G. A. McDougall, Mgr.

CHICAGO, ILLINOIS
904 W. Blackhawk St.
Phone: MI 2-6300
J. L. McIntyre, Mgr.

CINCINNATI, OHIO
4020 Cherry Street
Phone: MU 1-5420
H. B. Fuller, Jr., Mgr.

DALLAS, TEXAS
2217 Laws St.
Phone: RI 7-7315

KANSAS CITY, MISSOURI
200 Funston Rd.
Phone: FI 2-3615
R. E. Foley, Mgr.

LINDEN, NEW JERSEY
1201 Fuller Road
Phone: WA 5-2272
N. E. Liggett, Mgr.

LOS ANGELES, CALIF.
3250 Mines Avenue
Phone: AN 3-2113

MEMPHIS, TENNESSEE
802 Royal Avenue
Phone: JA 6-4212
C. E. Cramer, Mgr.

PORTLAND, OREGON
3332 N. W. Yeon Avenue
Phone: CA 3-6625

SO. SAN FRANCISCO, CALIF.
57 So. Linden Avenue
Phone: PL 6-5450
D. F. Barthelmess, Mgr.

TAMPA, FLORIDA
1803 2nd Avenue

FULLER WAREHOUSES
Richmond, Virginia
Westlaco, Texas
Cleveland, Ohio
Detroit, Michigan
Waltham (Boston), Massachusetts
Baltimore, Maryland

H.B. Fuller Co.
INDUSTRIAL ADHESIVES
St. Paul, Minn.

MECHANIZE... PROFIT-WISE!

...with a LAMSON AUTOMATIC PALLET LOADER

Palletizes cartons, cases, rigid bags quickly, economically

Referred to as the "perfect link between packaging and warehousing," the LAMSON AUTOMATIC PALLET LOADER is acclaimed as a huge, money saver by leading producers of package products.

Man hours per pallet load are cut. Considerable saving occurs in the reduction of damage or breakage to cartons. Valuable men are freed for other important duties.

These reductions have been more than enough to amortize the entire cost of the LAMSON AUTOMATIC PALLET LOADER.

The introduction of the Automatic Pallet Loader was another LAMSON first in the materials handling field. A result of the ceaseless engineering vitality of LAMSON men firmly based upon 75 years of experience.

Why not bring your materials handling problems to the leaders in the field? Write LAMSON today for the name of your nearest Field Engineer. Or, simply clip this advertisement to your letterhead and mail to:

LAMSON

PIONEERS *the Conquest* OF INNER SPACE

LAMSON CORPORATION

209 Lamson Street, Syracuse 1, New York

PLANTS IN SYRACUSE AND SAN FRANCISCO • OFFICES IN ALL PRINCIPAL CITIES

Manufacturers of Airtube® (Pneumatic Tube Systems) • Integrated Conveying Systems • Pallet Loaders • Selective Vertical Conveyors • Bookveyors® Clinical • Trayveyors® • Food Service Systems • Blowers and Exhausters • Exidust® Central Vacuum Cleaning Systems • Dryset® Air Vacuum Systems

through production and into shipping. This lets us observe the adequacy of the specification. Occasionally the observations made in this followthrough dictate our modifying a specification.

Field inspections take place periodically to determine actual performance in the channels of trade. Returned goods always receive systematic inspection in the package development department to determine if the packaging contributed to the reason for the return.

Developing A Package

We may now assume that the data in the package development files regarding materials, components, supplies, and equipment are complete and voluminous. Incidentally, this material needs adequate indexing to assure quick and easy locating of any desired information.

General information and knowledge concerning available materials is abundant, and may indicate the availability of many materials and components possessing the potential properties needed for solving a particular packaging problem. The job of choosing the right materials to be tested for making a package can be burdensome unless you use a systematic procedure at this point.

It should be obvious that the more information we have about the needs of a product, the shorter will be our list of potential materials to satisfy those needs. The ability to screen out materials efficiently and economically directly relates to the detail of information available to define in advance, the requirements of a product and what its package must do. Therefore, the time and effort you use in assembling packaging requirement data reduce the time and effort required to develop the proper package.

Changes Difficult

Paradoxically, the development of packaging for new products that emerge from the product research department is not as difficult as changing an existing package. Sug-

Why Pay For Gummed Tape WASTE?

YOU SAVE UP TO 10%
on your Tape Costs with GILMAN
COLD-ROLLED GUMMED TAPE
because you use the entire roll

Gummed tape that curls costs the nation's business a fortune every year in waste.

Gilman "Cold-Rolled"® Gummed Sealing Tape, made with double AccuRay® nuclear controls, reduces tape curl, makes the entire roll usable right down to the core!

Instead of paying a premium for such superior tape performance, you actually save money when you use Gilman Tape. *Thrift, with highest quality—that's true economy!*

Ask your Paper Merchant
for Gilman Tape—regular or reinforced. If he cannot supply you—ask us.

Gilman Paper Company

630 Fifth Avenue, New York 20, N. Y.
Western Sales Office: Daily News Bldg., Chicago 6, Ill.
Mills at St. Marys, Georgia and Gilman, Vt.

PE

Please send Free copies of ☐ "Gummed Tape Tips from Gilman" . . . ☐ Color Swatch Book. Also, Free sample ☐ "Cold-Rolled" Gummed Tape ☐ "Cold Rolled" Reinforced Tape ☐ Asphaltic ☐ Non-asphaltic

COMPANY NAME_____

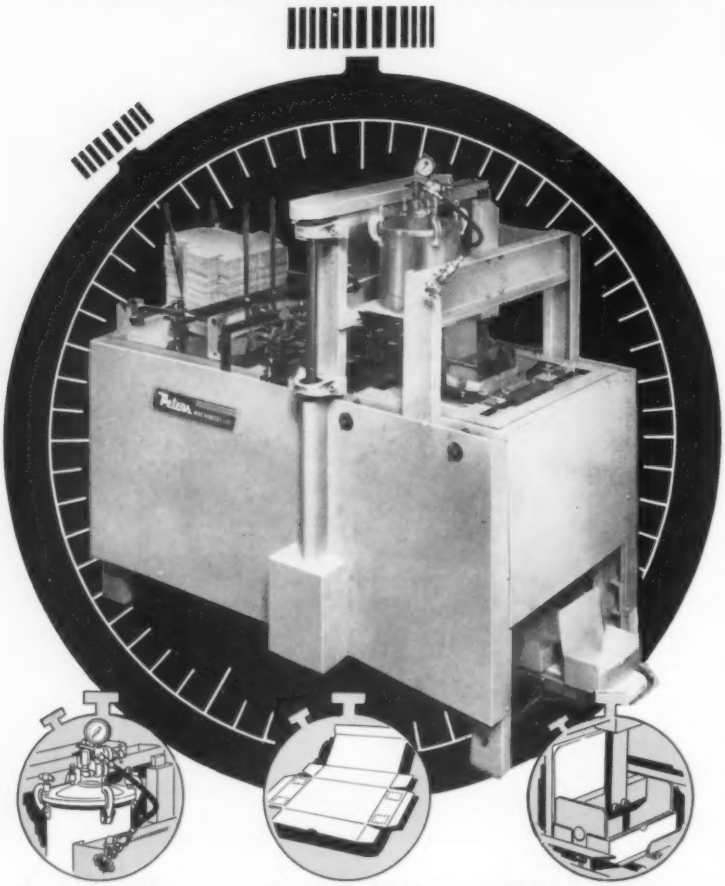
ADDRESS_____

CITY_____ ZONE____ STATE_____

INDIVIDUAL_____ TITLE_____

OUR PAPER MERCHANT_____

Cartons and Trays 70 PER MINUTE!



closed glue system provides clean gluing . . . eliminates costly make-ready and clean-up.

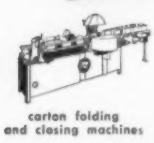
uniform glue pattern— glue is released only when applicators make contact with carton or tray blank.

precision forming— mandrel presses blank into forming run, bringing flaps into bonding contact.

Specially designed for low initial cost . . . heavy duty operation . . . moderate speeds . . . and economy of operation! New closed glue system permits immediate operation without make-ready waste . . . eliminates costly clean-up. Forms and glues a wide range of carton and tray sizes for packaging all types of products. Remember, **glued** cartons cost less for material, shipping and storage . . . and eliminate costly set-up labor. **Peters Model PG.**

Ask for a demonstration or write for descriptive folder

Peters MACHINERY COMPANY
4700 Ravenswood Ave., Chicago 40, Ill.



carton folding and closing machines

high-speed carton and tray forming machines

carton forming and lining machines

cellophane sheeting and stacking machines

gestions for improvement in existing packages may come from present suppliers, new suppliers, customers, our own engineers, sales promotion, purchasing, or production people—and everyone else who has an interest in the package.

The process of package development receives detailed treatment elsewhere in this article, but it is important to note at this point that, in reality, there must be much back-tracking in the several stages of development before any final acceptable package is ready for marketing.

When there is a great volume of work in package development, a work-order or statement of the intent of the project is helpful in clarifying, planning, and scheduling the task. Although this may seem easy to do, it is frequently the hardest part of the whole program. Yet, by clarifying the problem, the solution is usually obvious. Fig. 1 shows a form that may be helpful in this connection. The form is quite elaborate, but it serves several purposes.

The individual filling it out must concentrate much mental effort and attention on the problem or project before requesting laboratory work. From the very questions on the form, he may realize, for instance, that his problem is not restricted to domestic packages. Or he may become aware of the extent of the possible services and their costs that may be charged.

Nearly all requests will concern one of the subjects listed, and will fall into one of the categories of the services shown. This breakdown makes it quite easy for the laboratory to determine where to concentrate its time and effort. If the greatest part of its time goes to solving problems, perhaps not enough time has gone into the initial investigation or statement of the problem to be solved.

Learn To Estimate

As one's experience in package development grows, it is possible to estimate with accuracy how much time is necessary to complete a project. If it should turn

out that the potential benefit of a project will be less than the estimated cost of conducting it, or may result in some disadvantage, the decision may be to not start it at all.

So let us now assume that the project involves the development of a package for a new product: The first step is to choose potentially suitable packaging materials for fabrication into test packages and test them. (Certain of the following steps may not be necessary where only minor changes in packaging are concerned.)

Selecting Materials

A good package development group has a wealth of information on hand and readily available. If the right material is not available, you may need a lengthy program of basic research, exploration, testing, and screening. The material manufacturer alone, more often than not, does the basic research, but the exploration, testing, and screening are usually cooperative ventures. (Where package development facilities are limited, both users and supplier often employ the services of commercial laboratories.)

As we previously emphasized, the selection narrows down in proportion to the increase in knowledge of the packaging requirements. Fig. 2 shows the method of tabulating the packaging requirements. The basic data requested can be varied to meet the needs of a particular product. These product data are necessary for the pre-selection of materials. The package development laboratory does the preliminary screening, but the product research people make the final selection.

When you record on the form all the product requirements (see Fig. 2), it is then necessary to determine which of the available materials may possess the requisite compatability and desired barrier properties. With experience you will find that the list can be narrowed from all the available materials to a smaller specific group.

(*Turn page*)

WHICH MARK IS YOURS?

"FREIGHT MUST BE STENCILED or otherwise durably and plainly marked" reads Rule 6, Marking Freight.

Do your shipments pass this test?

PLAINLY MARKED—can you read the address at 10 feet?

DURABLY MARKED—is the address weatherproof and permanent?

Careless marking costs shippers millions of dollars yearly, say railroads and truck lines. Proper marking would save this.

Try the Marsh Stencil Method on your shipments one week free. **Write for sample stencil of your name and 24-page booklet on proper marking.**

MARSH

MARSH STENCIL MACHINE CO.
BELLEVILLE 34, ILL.

Pin to letterhead and mail for free booklet and sample stencil of your name.

NAME_____

TITLE_____

For more information circle No. 237 on Reader Service Card, Page 89

Coatings of TENITE POLYETHYLENE mean tight, heat-sealable closures

And here is a good case in point... French's Instant Mashed Potatoes.

All the original goodness of this food product is preserved in new packages made of paper, plus metal foil coated on both sides with Tenite Polyethylene. One coating of polyethylene serves to bond the paper to the foil. The other, on the inner foil surface, makes it possible for the pouch to be tightly heat-sealed --protecting the sensitive contents against loss of flavor and quality.

In addition to being heat-sealable for quick and easy closing, this versatile plastic has many other properties useful in packaging. It is chemically inert to most materials...doesn't puncture or tear easily...remains flexible at low temperature. And its resistance to water and water vapor helps prevent loss or gain of moisture.

Tenite Polyethylene is being used in a wide variety of packaging applications. It is extrusion coated on paper, boxboard, film and foil...extruded into tough, waterproof film...blown into bottles that are practically unbreakable...and injection molded into containers of all shapes and sizes.

Perhaps this plastic can point to some improvement or economy in packaging one of your products. For full information about Tenite Polyethylene, write EASTMAN CHEMICAL PRODUCTS, INC., subsidiary of Eastman Kodak Company, KINGSPORT, TENN.

TENITE®
POLYETHYLENE
an Eastman plastic

Package designed by R. T. French, Rochester, N. Y. Pouch packages manufactured by Thilmany Pulp & Paper Co., Kaukauna, Wisc., using Tenite Polyethylene.

Charts that tabulate the properties of films, foils, laminates, coatings, linings, metals, etc., are a great help here. But even when you determine your group of potential materials, you still cannot predict which of them will do the best job for the particular product without actual testing under controlled conditions.

Plan With Care

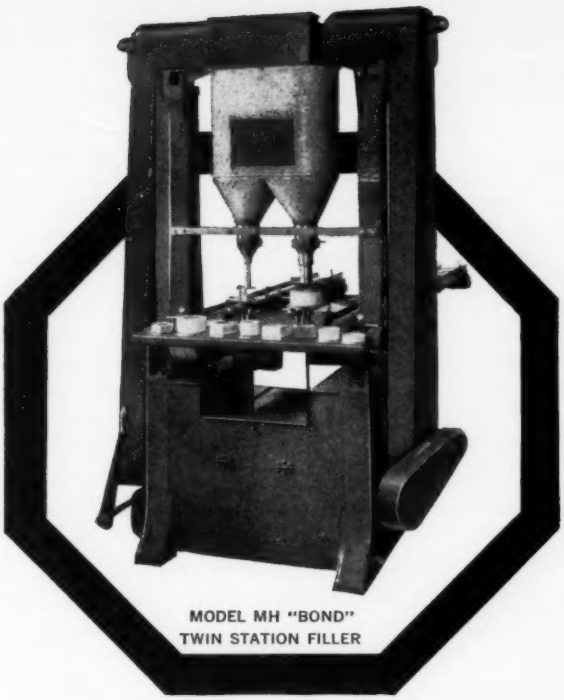
Prior to conducting such tests, however, it is a good practice to "think out" the remainder of the package. For instance, if there are several types of materials which will do a satisfactory job of functional packaging, what type of potential package would other company departments, say, promotion, prefer? Is production equipped to handle the package? Can a shipping container be made to carry the package through distribution channels, both shipment and storage? Will the package attract and satisfy the customer?

Each of the preceding questions constitutes a separate step in the development of a package. Consider the first question: What type of package would sales promotion like to have? From your product data (Fig. 2) you were able to reduce the number of available materials to a smaller group potentially satisfactory for this particular product.

What general groupings do these materials fall into? If they include glass, lined collapsible metal tubes, or an assortment of foil and foil laminates, what types of packages can be made from these basic materials?

At the present time, you must restrict your packages to those that can be produced by known fabricating processes. For example, glass, containers can be blown, blow molded, or drawn. Undercuts (deep indentations) are not possible in any of these methods. Fabricating processes for metals, foils, and films are similarly restricted to molding, extruding, die-cutting, etc.

(Part II, concluding this article, appears in our next issue.)



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Simple me
gummed tap

By A. P. Schulz, Merchan
Spiegel,
Ernest E. Werle, Director
Darling a

How it all started–

Before this project of teamwork got under way, Spiegel one day found itself facing a crisis: Its packages were falling apart in the post office. Upon receiving a mandate to solve the problem, Mr. Schulz called on Darling and Co. Thereupon, Mr. Werle visited the Spiegel plant. At this time, Frank Rizzo, Spiegel's purchasing agent, and Joseph Carrigan, its packaging engineer, accompanied Messrs. Schulz and Werle on a searching tour of the plant. The resulting four-way discussion launched a joint effort to improve the company's packaging operation. Early phases of this project included giving verbal instructions to those working on the packaging lines and issuing bulletins to pin down pertinent details in writing.

Why was Spiegel having difficulty with gummed tape? Why were its packages falling short of standards? Just what should a gummed tape accomplish? Systematic searching for answers to these questions quickly revealed that neither the paper, the glue, nor the dispensing equipment was at fault. This process of elimination revealed incorrect application and improper use of tape dispensing equipment as the crux of the problem.

Thus, finding that effective use of gummed tape rests on correct application, **the first step was to provide simple tests and techniques for quick evaluation of tape performance and for quick measurement of packaging effectiveness.** Further, it all had to be very simple to lend itself to the speed of day-to-day operations and the capabilities of the people taping our packages.

How Tape Functions

A normal characteristic of a good gummed tape is that it permits the fast sealing of a package. Some tapes function faster than others, but all of them offer permanent bonding.

Before reviewing these simple tests and the difficulties they help to remedy, we might look first at basic principles of gummed tape functioning. An understanding of how it all works reveals underlying tape behavior and explains its effective use and the difficulties arising from its improper use.

The functioning of gummed tape when applied is so fast that for convenience of discussion, we might break it down into its elements– chronologically. There are five key phases of its on-the-line performance.

1. **Water is applied to the surface** of the coating, i.e., to the layer of glue on the paper tape.

2. **At once, this water begins to absorb** into the glue layer on the tape. By osmosis it forms a hydrated jel.

3. **Next, whatever soluble substances present** (in a given formulation) **dissolve in the absorbed water.** This creates an internal pressure in the jel. In turn, this causes exudation of such solution through the collodial jel—into the residual layer of water on the surface, i.e., diffusion.

4. **Once the moistened tape gets into position** on a porous wrapping paper or corrugated box liner, there is a rapid absorbing of the free water and surface solution. At the same time, in the course of sealing the tape, there is an application of pressure. This pressure partly rup-

A. P. Schulz attended The University of Wisconsin. Prior to joining Spiegel, Inc., he was with George E. Roper Corporation, Bendix Home Appliances Inc., City Products Co., Norge Corp. and Thor Corp.; in design, development and mechanical engineering capacities. For eleven years he has been hardlines merchandise standards supervisor at Spiegel, and is responsible for development and maintenance of merchandise quality standards, as well as for specifications for items such as paper and gummed tape.

methods measure tape effectiveness

Merchandise Standards Department,
Spiegel, Inc., Chicago, and

Director of Research,
Darling and Company, Chicago

Here is user-supplier teamwork in action: An expert in mail-order packaging got the help of an authority on animal glue in identifying the causes of deficiencies in gummed tape performance. Together they delved into the problem, pinpointed requirements for tape performance and crystallized a series of simple, on-the-spot tests of tape effectiveness. Mr. Schulz and Mr. Werle concede these tests are merely indicators, not definitive measurements, but they assert that the tests have real value in day-to-day packaging line evaluation of gummed tape. They stress the importance of correct application techniques, pointing out that even the most suitable tape and dispensers will not function correctly unless used properly.

tures the relatively soft part of the jel.

5. And while this is going on (with absorption of the solution and some of the dispersed jel), all of the jel becomes somewhat dehydrated and sets. This setting is just enough to establish immediately a comparatively firm bond. This bond is strong enough to overcome the natural springiness of the package—for example, the flaps of a corrugated box. It takes but seconds for the seal to become stronger than the surfaces bonded.

To understand the foregoing five phases, it helps to remember that the total film (glue) thickness of coating on gummed tape is only about 0.001 in. thick. But during the sealing operation, these successive physical changes take place in rapid order. **The entire operation described above requires only a second or two for an initial tack.**

Another preliminary to setting up practical tests of tape performance is to spell out standards of tape use. **First attention goes to the wetting of the tape.**

Water Usage Critical

Proper functioning of tape is conditional on applying an optimum quantity of water to the tape. Also it is necessary to apply the tape to the package or box immediately after wetting. Packagers sometimes get effective results when not doing this at once, but there must be compensation—to offset the delay. For example, if you are having as much as a 30-sec. delay from the time of wetting until the time of application, you need to apply increasing amounts of water.

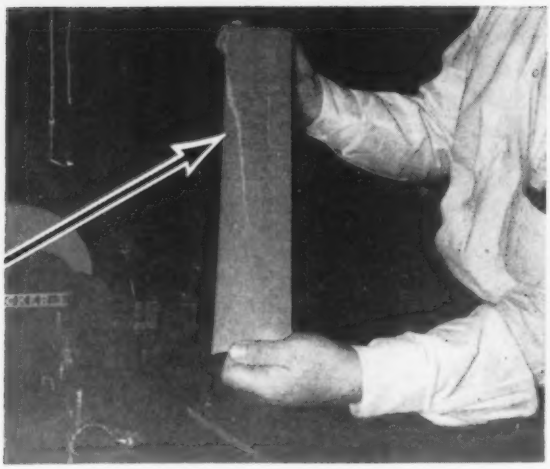
One way to do this is by increasing the level in the tape dispenser pot. On the other hand, too little water will cause popping off. This is caused by low water level and/or an encrusted or worn brush, for example. Brushes should be washed and allowed to dry thoroughly each day.

Some of the difficulties arising at this point represent nothing more than careless disregard of the tape dispenser manufacturer's instructions. Similarly, people on the packaging lines sometimes ignore the recommendations of tape manufacturers. For instance, where an application called for fairly warm water, we found packaging line crews filling their tape dispenser at the drinking fountain—thus supplying water with a temperature of about 40°F.

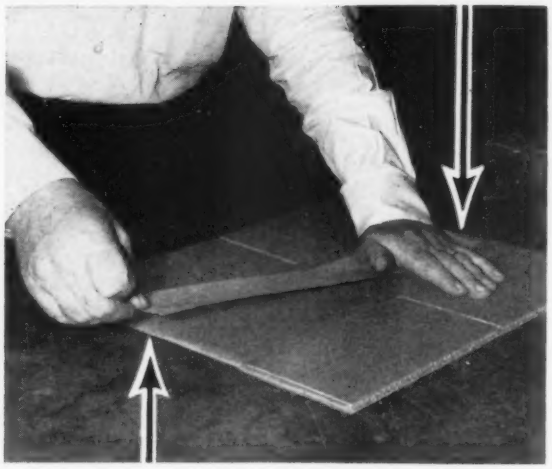
How About Proper Wetting?

A properly wetted tape has a practically completely wetted sur-

Ernest E. Werle is a graduate of Cooper Union Institute of Technology with a B.S. degree in chemistry. Prior to joining Darling and Co., he was with Pease Laboratories, and with Van Iderstine Co. as chief chemist. Mr. Werle is a member of the Chicago section of American Chemical Society and is a fellow of American Association for the Advancement of Science. He is chairman of the research committee of the National Association of Glue Manufacturers.



1 PROPERLY WETTED TAPE has almost completely wetted surface and its appearance is smooth, even and glossy. There should not be too much streaking because this might indicate high surface tension.



2 TO DETERMINE IMMEDIATE GRAB or bite quality of tape, pull test involves lifting tape with one hand and following tape with palm of other pressing it. Test should be made immediately after applying tape.

face. Its appearance is smooth, even and glossy. (See Fig. 1.) While small streaks are acceptable and pose no problems, a user should watch out for too much streaking. These streaks may indicate high surface tension, revealing an improper wetting action.

Methods of overcoming an excessively nonuniform wetting of tape include using (1) a heated dispenser, (2) a double-brush dispenser with a distinct separation between brushes, or (3) a wetting agent in the moistening water—e.g., a heaping teaspoonful of household Tide in one gallon of water.

Sometimes where there are high-speed dispensers, an animal-based glue coating shows a tendency not to wet uniformly, in that unwetted streaks or islands appear in the dispensed and moistened length of tape. Usually there is no problem with a slow-speed dispenser.

Waiting Too Long

However, it is a question whether a certain amount of apparently unwetted surface is not a benefit rather than a detriment. It is conceivable that a small proportion of unwetted area (for example, one-fourth of the total surface) could be an aid in the quick grab of the tape. Such surfaces, when applied, do form 100 per cent seals.

When inspecting packages, it is sometimes found that some tape seals are 100 per cent bonded and others only 5 to 10 per cent bonded—using the same tape. More often than not what has happened is that the operator waited too long after moistening some of the tape. **He should apply it promptly after dispensing.**

A seal apparently all right at the time of application can result in separation of the bond or seal failure upon drying if the tape had not been applied promptly. **Taping crews have a tendency to stretch out lengths of tape for use too far in advance.** Sometimes they cut several at a time, and these dry out (even within 30-sec. intervals) thus becoming unusable. As in other packaging operations, correct supervision plays a major role.

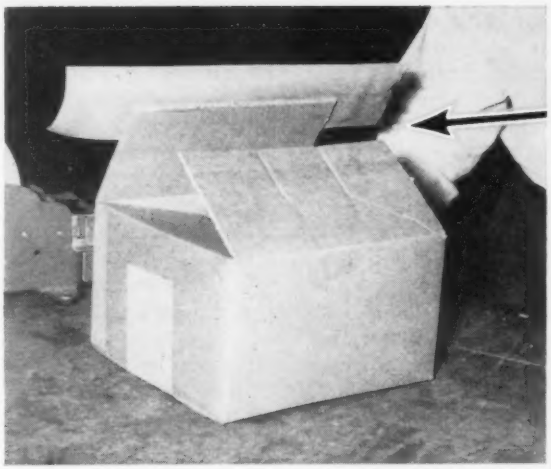
Tests With, Without Delay

In looking at practical tests of tape performance, there are two key considerations: **The testing for tape adhesion (1) when it is applied immediately and (2) when it is applied after a delay, that is, an interval of open time.** And these or any other tests should be made on packaging surfaces. This means that the same paper or corrugated boxes used on the packaging lines should be used in these tests. Although the tests are inherently simple, they still need to be conducted in as precise a manner as possible. A typical surface might be the two top flaps of a corrugated box.

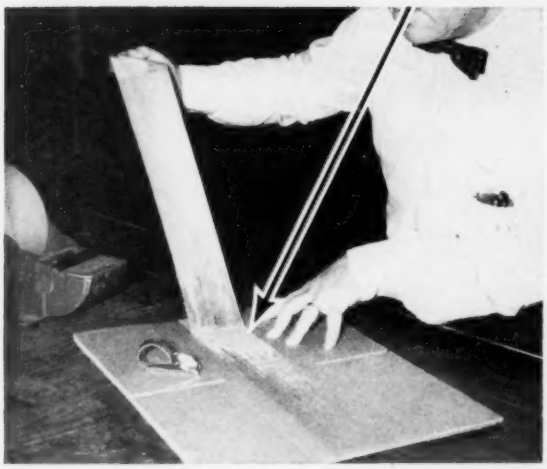
Another starting precaution is to be sure that there is a uniform amount of water applied in the course of the testing. Differences in the amount of water applied can affect the open time. The more water used, the longer the open time because of there being more water to dry out.

Our first test is to determine immediate grab quality. We dispense a piece of tape, then we immediately apply it to a packaging surface. Simultaneously with our application of tape to this surface, the pressure of the palm of one hand rests on the tape, and we immediately slide the tape in the same plane as the bonded surface. As we pull with one hand, the palm of the other (pressing down on the tape) follows the tape. (See Fig. 2.)

A satisfactory tape shows a degree of immediate grab or bite in contrast to a slippery, lubricated feel. This is especially important in sealing new boxes which have a springiness of the flaps that would dislodge the tape (see Fig. 3) if it did not bond at once—and hold. Whether because of the particular



3 **IF TAPE LACKS SUFFICIENT TACK** to hold box shut immediately upon application, flaps of box dislodge tape. This may be due to springiness of box material or to scoring technique of box manufacture.



4 **TO SHOW TIME NEEDED TO PULL FIBERS,** this test involves counting seconds needed for fibers to tear as tape is pulled. Shaded areas show fibers torn from surface of box. Timer is watch with second hand.

fibers of the board (such as kraft) or by virtue of the scoring technique or newness of the box material, this is a typical problem. A tape must hold to be effective.

How Fast A Bond?

Note that no testing equipment is necessary, and the tape can be tested in a matter of minutes. It is not necessary to use standard testing stock. In fact, the test should be done with the same surfaces to be used in the packaging operation.

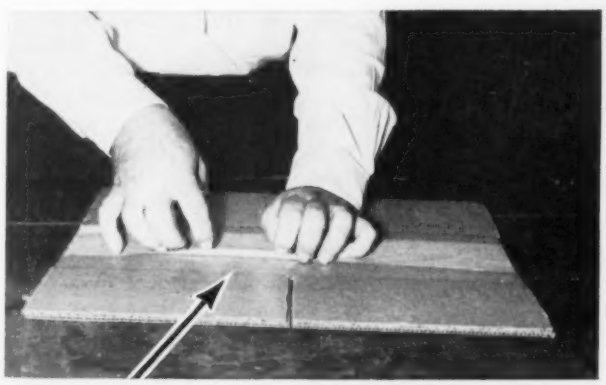
Another test gives an approximation of the time necessary for moistened tape to adhere sufficiently to form a bond strong enough to tear fibers off the surface to which the tape is applied. Start of this test is to dispense a length of tape (for example, 15 in.) and apply it to the intended surface with a light, single back-and-forth rubbing of the hand over the positioned tape.

At the same time, you count the number of seconds (starting when the moistened tape is cut) it takes for fibers to tear as the tape is slowly pulled up at a 90° angle. (See Fig. 4.) A typical tape, depending on the amount of water applied, will pull fibers in about 20 sec. after moistening. **Significance of this is that the adhesive has bitten into the package surface, so that instead of parting the wet adhesive layer, you are pulling the fibers of the bonded surfaces.**

Besides the time it takes to tear fibers, you should observe the amount of pull required to separate the bond before the fibers tear. Obviously, the more pull necessary,

6 **AFTER TEN SECONDS OPEN TIME** (as checked by watch) note fibers torn away from corrugations of box. This shows excellent bonding by tape. Use same boxes for tests as used in normal packaging work.

5 **PICK TEST** checks tape after it has dried before application to box. Edge of tape pulls away from box surface. Ease of picking away tape indicates excessive "open time" before tape application to box surface.



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the better the initial bonding was.

Incidentally, this test can be modified to reveal that repeated rubbing of a tape after application has practically no effect upon the time to get fiber rupture. This can be ascertained by rubbing an applied piece of tape back and forth for 5 sec., and comparing the time for fiber rupture with that of a single back-and-forth rub. This illustrates further that a good, properly wetted tape does not require repeated rubbing in practice. Complete contact of the tape with the opposing surface is all that is required.

Finding "Open Time"

Another practical test is one that determines open time. You moisten a length of tape and hold it in the air for increasing lengths of time. You might do this with 10-sec. intervals, with, normally, a maximum of up to 30 sec. After you apply the tape to the intended surface, you let the seals dry adequately, perhaps for two hrs. or more.

Then you inspect them by carefully parting them by hand. (See Figs. 5 and 6.) This will reveal the decrease in per cent of bonded area that results from an increase in open time. We think there should be a minimum of 80 per cent adhesion area where there is a 10-sec. delay used in tape application. (See Fig. 6.)

For all practical purposes, however, the higher the grade of tape (from the standpoint of quickness of tack), the shorter the open time available. **In other words, faster tape has less open time.** This test shows that tape should have an optimum tack depending on what you wish to accomplish rather than either a high or a low tack.

Things To Watch

When considering a 10-sec. delay in the application of tape after moistening it, **remember that the area of adhesion of dried bond is important.** Also the speed of application is important. You must hold the open time to a minimum. Also be watching out for the popoff of seals. Often the seals of tape pop off because of too much open time prior to tape application, allowing the glue to dry. Insufficient water to start with may be the cause of this popping off.

In making any of these tests you must remember that a large diameter roll of tape moves over the dispenser brush in a rather flat manner. But as the tape feeds out and the roll decreases in diameter and circumference, its degree of curl increases, and the tape is contacting the brush on two edges. As a result, the tape absorbs more water. These differences in the amount of water applied result in marked differences in performance results. To avoid the effect of such curl upon water pickup prior to testing, the back of the tape should be drawn over a sharp edge to remove its curl.

Tests Merely Indicators

All in all, a package user should remember that these tests are merely indicators. They spot reasons for changes in performance of tape and give only a rough measure of its effectiveness. They do not take the place of laboratory tests. However, they have great value in that they are practical, easy to do and their results can be used to correlate a production line efficiency.

On-the-spot checking of packages from the production line will reveal the quality of the seals being obtained. This can be done by attempting to peel the tape from the package some time after the seal has dried. If the tape cannot be parted from the package without fiber rupture, then perfectly good seals are indicated. However, if the edges of the tape are not stuck and can be picked off without fiber rupture, something is amiss. In this case, either too little water has been applied to the tape, or too long an open time was used. You normally make the pick test after one hour.

Finally, remember to use judgment in making any of these tests. Count your seconds carefully, exercise a little patience, be sure to have correct specimens (see Fig.

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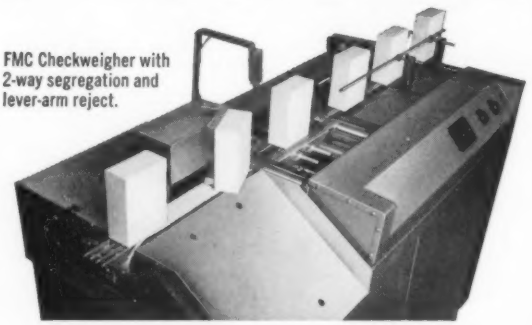

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6), with realistic packaging conditions, and you will find all these simple tests and practices useful in predicting tape performance.

Application Pointers

In examining tape application, you must remember that all you need is light pressure of the moistened tape on the opposing surface, (e.g., the box flaps) to get a firm initial bond, with a normal good quality sealing tape. Additional sustained pressure or repeated rubbing does nothing to help the bond; we still find that we tear fibers in about 20 sec. But if there is a poor quality, slow-acting tape, it may require repeated rubbing for some time to get a satisfactory initial bond.

It is interesting to note that **when normal animal-glue-based tape is dispensed at room temperature, you will find very little soluble matter removed by the brush.** In the course of our tests, we found a 600-ft. roll of 3-in. tape had only 0.05 per cent of its glue coating removed by the dispensing process. As a result, we learned that the glue does not dissolve, but swells. Water is absorbed into the tape.

Have A Yardstick

In making any of these tests, it is important to conduct them with reference to tape of known good performance. You then use the good or standard tape as a yardstick. Hand in hand with this is the problem of controlling the storage of tape. **In contrast to recommendations offered by some tape manufacturers, we think that you should keep your tape warm and dry, rather than cold and dry.** In other words, you put the tape on the high shelves in the storage room, rather than on the low ones. This is contrary to general practice, but we think it is conducive to better performance and will be so indicated by experience.

If you should have tape that shows poor tack qualities, very often such tack qualities can be improved considerably by placing the roll on a hot radiator for a couple of hours. (*End*)

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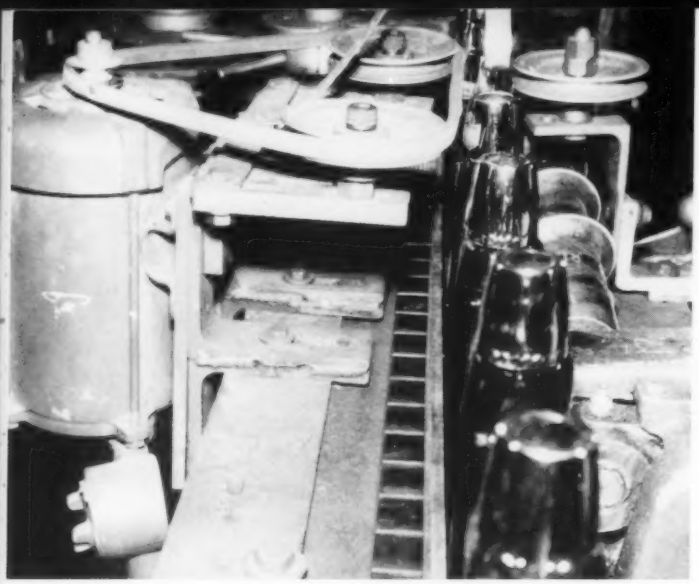


FAST-TRAVELING V-BELT of simple motor-driven device touches odd-shaped caps lightly, turns them to last thread, eliminating need for operators to do job.

Applying odd-shaped caps to bottles

Simple company-built device automatically twists special shaped screw caps on bottles, eliminates need for operators to do the job.

By Charles R. DeSpain,
Vice President and General Manager, Heaven Hill Distilleries, Inc., Bardstown, Kentucky

By developing a simple device for "starting" odd-shaped screw caps on bottles, we solved a major problem encountered when we adopted a jigger-shaped cap for our flask-style whiskey bottles. Its use is required on only one of our lines which run this style cap. Nevertheless, it is a very effective piece of equipment.

Hand-Tightening Not Satisfactory

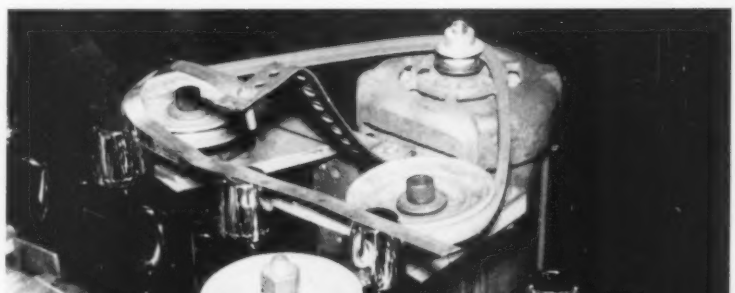
Since the jigger cap is tapered slightly and is much taller than our regular 28-mm. cap, we had the problem of applying it to the bottle. This cap cannot be handled in the usual manner by our regular capping equipment. Hand-tightening is slow and not satisfactory from the standpoint of obtaining proper torque to insure against leakage. Therefore, it was necessary that we apply these caps to the bottles by hand, and then have a way of tightening them automatically and firmly.

Corking machines have tighteners. For two of our lines, each of which is equipped with a Haskins corking machine, the solution was simple. Tighteners were adapted to the heads on each corker. The caps are still laid on by hand, however. In the case of one line which has only an Alcoa capper, the problem was more complicated.

We had special heads made to fit this capper for tightening the caps *after* they are partially screwed on, but these heads will not apply and "start" the caps. Thus, in the beginning we placed the caps on by hand and gave them several turns to get them started. These extra motions added up to a great deal of extra time.

We developed and built a simple device to twist the caps after they are laid on the bottles by hand.

(Turn page)



FLEXIBLE STEEL STRAP holds caps in place, prevents their wobbling as they touch belt. Free-turning pulley on opposite side of conveyor from device holds bottles firmly against belt.

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The equipment is located on the conveyor leading from the filler to the capper, and opposite the worm-feed to the capper. It consists of a ⅛-h.p. motor mounted to a frame so that the motor shaft is in the vertical plane.

Device Uses V-Belt

Two stationary shafts are mounted on the same frame and in the same plane as the motor shaft. These are positioned so as to form a triangle with the motor shaft. Distance between the three shafts (center to center) is about 9 in. Each of the three shafts is equipped with a V-pulley on which rides a V-belt. The motor pulley diameter is 1½ in.; the other two, 4 in.

Alignment Important

The portion of the belt between the two 4-in. pulleys is aligned over the edge of the conveyor. The device is adjusted so that the belt makes a slight angle (in the horizontal plane) with the conveyor. When the bottles approach the first pulley, their caps are about ¼ in. from the belt. Because of the angle, as the bottles move forward, they become progressively closer to the belt, and the caps touch it when they are about midway between the two pulleys. As the bottles continue moving forward, the bottle caps are held against the belt until they clear the second pulley.

A free-turning, 4-in. pulley mounted on the opposite side of the conveyor and directly across from the second pulley holds the bottles firmly but lightly against the belt. Mounted directly over, and parallel to, the bottle conveyor, a piece of thin-gauge, flexible strap steel holds the caps in place and prevents them from wobbling and coming off as they touch the belt.

Thus, in operation, the filler discharges the bottles onto the conveyor which carries them by the cap-twisting device. Before they reach the first pulley, the girls place the jigger-type caps loosely onto the bottles. As the bottles pass the device, the fast travelling V-belt contacts the side surfaces of the caps and turns the caps down to the last thread. The bottles then are carried onto the capper for tightening the caps.

This motor-driven device performs the job easily, efficiently, and is fool-proof. It is simple to construct and its principle can be applied to other odd-shaped caps where proper capping equipment is not readily available. Perhaps you can adapt this idea to a similar job in your capping operation.

(*End*)

Charles R. DeSpain received a B.S. degree in chemical engineering from Speed Scientific School of the University of Louisville. Before joining Heaven Hill Distilleries in 1945, he was associated with other independent distilleries in a technical and managerial capacity. Mr. DeSpain is a member of the American Institute of Chemical Engineers and is a licensed professional engineer in the State of Kentucky.

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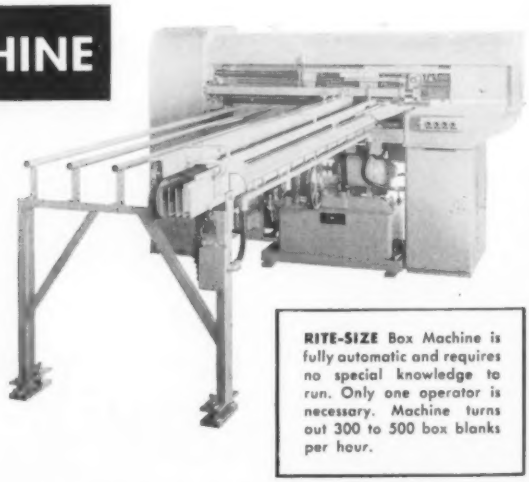
- ***Reduces*** **box inventory investment**
- ***Cuts*** **unit cost of packages**



RITE-SIZE Box Machine is fully automatic and requires no special knowledge to run. Only one operator is necessary. Machine turns out 300 to 500 box blanks per hour.

The Colt Rite-Size Box Machine is designed to make corrugated cartons *right in your own plant — as you need them.* It produces any size and style box you require, in small or large lots, quickly, accurately, and at lower cost! (A complete change in carton dimensions takes only a minute and one-half.)

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A complete box making department takes only 1600 square feet of space, *including storage.* Reductions in carton storage areas alone have resulted in floor space savings as high as 90% in many plants!

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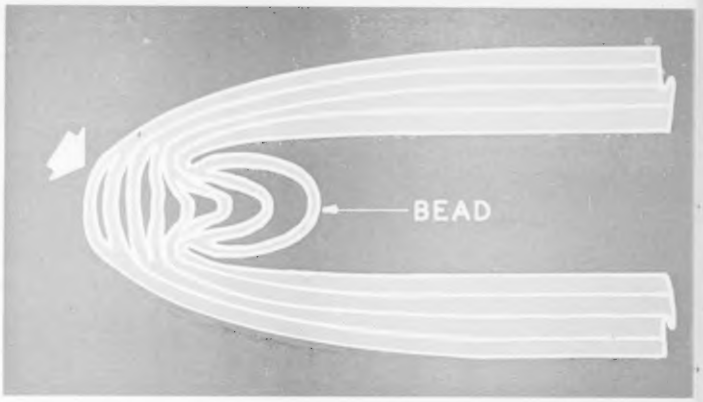


ABSENCE OF CRACKING OF OUTER LINER (box arrow) and good bead formation indicate proper scoring of carton. Note how scoring affects plies of stock within sheet. Layers of fibers are expanded to show presence of air—darkest areas at fold.

Practical pointers to better folding carton performance

Part II–Scores can help or hinder carton effectiveness

Assuming that a package user selects (with such help as necessary from the carton manufacturer) the right material for its cartons, the next step is the manufacturing process. Although package users may not require an intimate knowledge of the manufacturing art, it is important for them to understand the aspects of carton making that affect performance. Among these are scoring and prebreaking.

Cartons for use on high-speed packaging lines require more than just uniformity of structure; they also demand uniformity of function. Getting this uniformity means close attention to scoring and prebreaking, among other details. However, all this assumes that, in addition to having paperboard correctly selected for the particular carton involved, there is a good die.

Start With Accurate Die

If cartons are to perform consistently well at high speeds and if each carton is to be a duplicate of every other carton of its particular kind, run, or order, an accurately made cutting and creasing die is mandatory. This does not mean merely that the cutting and creasing rules are correctly positioned within the die chase so that dimensions of cartons are uniform. It also means that the rules *function* correctly during the *entire* cutting and creasing operation; also, that the creasing rules have proper radius of curvature and the tympan cutouts are of proper width and depth to form the score's bead correctly.

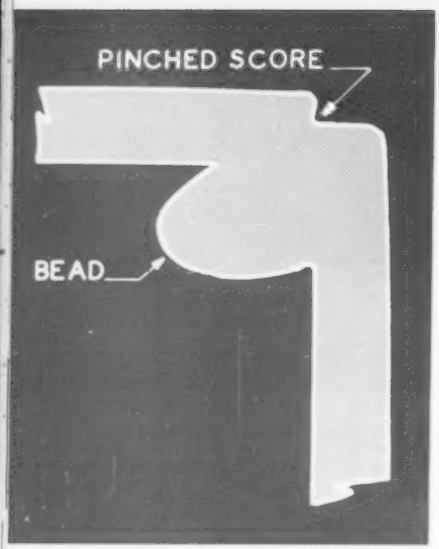
Note particularly the term "creasing"; it relates to scoring. Successful performance by a carton makes good scoring necessary. There are problems with creasing that do not arise with cutting because cutting is an aspect of carton-making that usually is right or wrong—either the cutting die cuts the stock in the right places or it does not. Also, sharpness of the cutting rule is important—to insure that cut edges are not ragged or feathered. (To avoid any confusion, "cutting" refers here to the actual cutting and separation of the board, such as the edges and slots—not to cut scores which are used in some carton constructions.)

With creasing, on the other hand there can be differences of degree. Although many scores are either just right or all wrong for particular applications, there can be all sorts of defective scores and gradations of scoring that adversely affect carton performance on the packaging line. An understanding of carton scores, their effective use, and the problems arising from deficient scoring should help the package user to improve carton procurement and use.

Scores: To Open, Form, And Close Cartons

A user must keep in mind the basic purpose of scoring: To make the carton blank open, form, and close properly. This means that scores not only require correct impression by a scoring rule but also correct positioning – scores must be precisely square. If the carton-making process fails in the slightest degree to produce squared-off scoring, the flaps will be out of alignment for closing.

A good score is one that has



PINCHED SCORE at cutting and creasing press. Problem is magnified when too heavy a cut occurs—score is not wide enough. Note how pinched score compares with good one in Fig. 1.

correct depth and width (in proportion to the caliper and character of stock) and it *always* has a bead on the inside. What makes this bead is that, when the scoring rule strikes the carton stock, it breaks the interior bond between the inner plies of the sheet. In the correct forming of a score, the plies go to the inside rather than the outside of the sheet.

Need Correct Bead

This stresses another characteristic of a good score: Along with an adequate bead on the inside of the board, there is no cracking of the top or outer liner on the outside. It is easy for the scoring action to fracture the outer liner if the stock moves to the outside rather than the inside when the plies separate. Further, this separation takes place whether the carton is made from cylinder or Fourdrinier board.

At the same time, it is important that the scoring rule does not go too far into the carton stock. This flattens the bead and results in a knife action rather than merely a scoring action. A point worth remembering is that getting a good score means weakening the plies at that particular point (i.e., along the line of scoring) and causing them to separate. This separation results in an air space between the plies within the sheet.

What Happens To Plies

The amount of air between each two adjacent plies progressively increases as the score goes from outside to inside of the board. As a result, the plies nearest the top liner are barely deformed and those nearest the inside (or high point of the bead) tend to follow the bead. This means there is a successively thicker air gap between plies (from outside to inside).

It is possible to have a sheet with the plies so well bonded internally that it does not score well. Stock of unusually heavy caliper might be an example of this. Also, liner strength has a lot to do with how well the stock withstands scoring. There is always the

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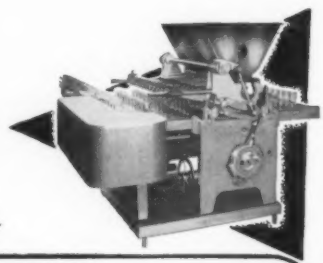

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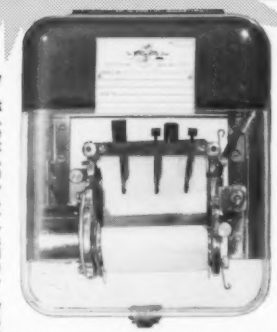

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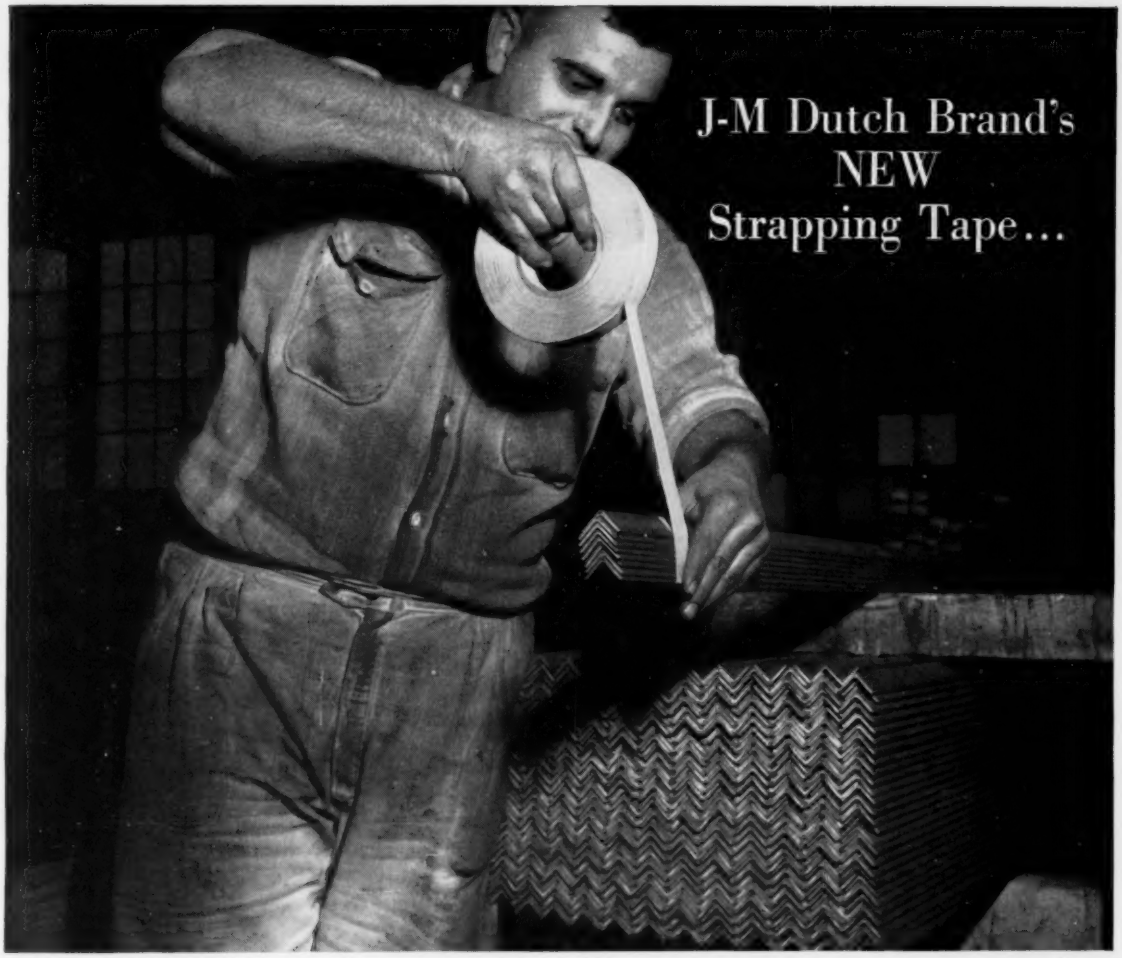

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possibility of rupturing the liner, and there must be adequate strength particularly in the outer liner.

Note Board Content

If the furnish from which a sheet has been made has a lot of groundwood in it, the fibers are short. This suggests the possibility that considerable cracking may occur. Similarly, grain direction is an important aspect of carton scoring. This is significant especially in getting proper body scores and in avoiding a rounding of the stock.

Some package users include details of grain direction, in connection with scoring, in their carton specifications. However, companies wishing to build this degree of intricacy into their carton requirements need to be sure of having adequate knowledge and background. Borrowing the specifications of others, without having the background by which to apply them to one's own requirements, can lead to trouble.

Use Of Cartons

Details of particular carton use become important in establishing scoring requirements. For example, flat, unfolded and unglued carton blanks, intended for forming around a mandrel in, say, a double package making machine, do not have the glued glue lap as do cartons which are folded and pre-glued by the supplier. The former cartons do not pass through the gluing operation as the latter ones do, and their ends are glued in squared position on the mandrel of the double package maker.

In these mandrel-formed cartons, there may never be any bending at the cross-grain scores beyond 90°, as there is with a pre-glued carton wherein two of its opposite scores are folded 180° for delivery "knocked down." Then, when the pre-glued carton is used, it is expanded, and the scores folded 180° are unfolded 90°. There is no bending beyond 90° in the mandrel-formed cartons; hence, by far and large, no prebreaking, and less stress on the board itself.

These references to automatic packaging machinery should not suggest that scoring is unimportant for cartons going through manual or semiautomatic packaging operations. Obviously, high speed requires a greater precision of fabrication and uniformity of performance than does manual packaging, but regardless of how cartons are filled, good scoring is vital for the protection of any carton's outer liner.

Scores Affect Protection

This directs attention to the functional or protective aspects of carton scoring. Some package users of fat- or oil-bearing products package their products directly into a carton. These and other package users may also require water-vapor protection for their products to insure that the freshness of the product is maintained until it reaches the ultimate consumer; sometimes until the last

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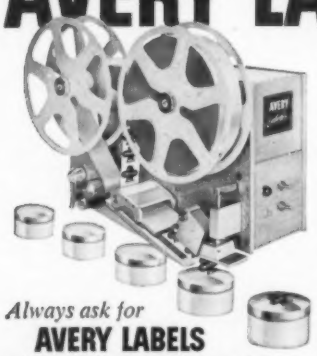

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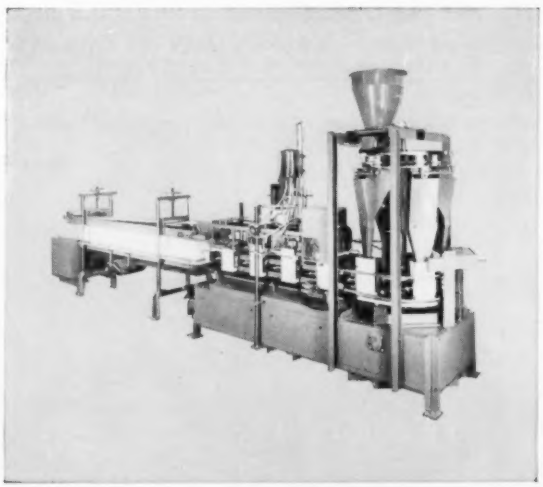
It isn't always easy. Particularly when you're comparing competitive equipment before you buy. What you want to find out is how much the machine will do for you.

For example, let's take a machine that forms, fills and seals cartons. A machine that will handle anything from grass seed or dog biscuits to powdered milk. Here's the kind of performance you can measure:



The machine should be automatic. It should do as much of the packaging job as possible. By itself. Failure within the sequence of forming, measuring, filling and sealing should be automatically detected and controlled.

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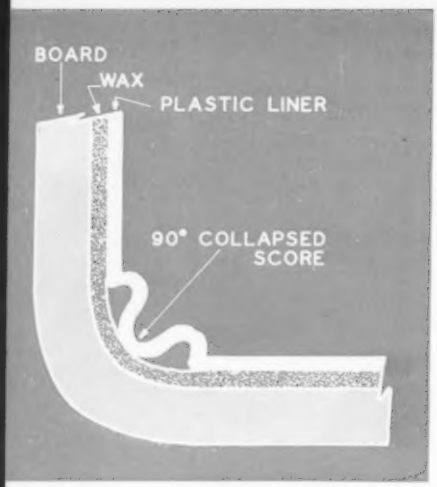

COLLAPSED SCORE, such as on board with lamination or functional coating, injures functional properties of carton. Inner surface of board at score has no bead, board is ruptured. Note air pockets at 90° collapsed score.

portion of it is used up. To provide grease and/or water-vapor protection, carton manufacturers may employ an inner plastic liner coated on, or laminated to, the board, utilize a greaseproof or glassine-laminated board, or resort to board otherwise treated—perhaps at the board mill.

For the package user to obtain the full measure of protection for which it is paying, the carton manufacturer must exercise care throughout the manufacturing operation not to damage the barrier. This means proper scoring and subsequent conversion operations, particularly during gluing operations.

Avoid "Checks" In Score Beads

Improper scoring, for example, or severe ironing of the cross-grain scores during gluing of the side seam, may result in checks in the score bead, causing board fibers to rupture through the barrier. These fibers act as wicks which convey grease to the outside of the carton where it can stain a clean white surface or mar the printing. Grease on the outside hastens rancidity and off-odors.

A pinched or collapsed score with a wax lamination, caused by too heavy an impression during the cutting and creasing operation, or a score excessively ironed during gluing of the side seam, will impair the film continuity of the wax barrier. This results in much lower water-vapor protection and product quality than a correctly fabricated package provides. Too narrow a score on board with a film having only moderate extensibility may result in film rupture at a 90° or 180° fold, even where there is no score cracking or checking of the board itself. Then, with a fat-bearing food, for example, cookies or doughnuts in a tray-type carton, there will be grease penetration through the carton, with the hazards described above.

A break in the barrier, or a disruption of film continuity, is a condition usually not visible from the outside of a carton, and frequently, not even from the inside when the carton is opened. Generally, the offending score may not adversely affect the cartoning op-

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eration on the packaging line. These reasons point up the need for close supervision and inspection by the carton supplier, and effective quality control by the package user.

Carton Plant Problems

Score cracking is probably the most common type of scoring deficiency. A lot of score cracking in a given run may indicate a need for changing the cutting and creasing rules in the die. At the same time, a skilled cutting and creasing press operator can compensate for this condition in his make-ready. Another possible cause of score cracking is excessive ironing of scores during the side-seaming operation—particularly if the stock is too dry.

Both of these points suggest that the cause of the trouble is primarily a carton plant matter. The user should not be concerned with it beyond taking steps to assure that cartons damaged in this way do not reach the packaging lines, and that the plant producing the cartons correct the problem promptly. Some carton manufacturers subscribe to this view. Others recognize that package users want to delve more deeply into such problems and they seek to educate the users in the subtleties.

Spec's Get Involved

The reason carton manufacturers object to a user's writing too many restrictions into specifications (in an effort to prevent such difficulties as cracked scores) is this: The user might get so involved in spelling out methods of correcting the trouble that it becomes impossible for the carton producer to make the correction without deviating from the user's written specifications.

Experts among both users and suppliers reiterate their warnings that users, seeking to draw up intricate, highly detailed specifications, must be sure they know what they are doing; also, that they have enough background and knowledge on which to base such specifications.

However, some companies have reached the point where they maintain different scoring specifications for different boards. For each of the carton stock types they use, such as sulphite, bleached manila, or any other, there are scoring requirements particularly adapted to the given board.

Grain Direction

Another phase of the problem is the cross direction (CD) and the machine direction (MD) scores. CD scores refer to those running perpendicular to the grain or machine direction. MD scores are those running in the machine direction. Machine direction refers to the line of travel of the stock through the board-making machinery at the mill.

Normally the CD scores are much cleaner than the MD scores. In this connection, package users might note that, in normal carton plant fabrication practice, the working scores along the length of a tube-style carton generally are CD scores. It is harder to score with the grain than against it. Carton experts point out that normally there is a better bead in the score running across the grain, in contrast to a score running with the grain.

Why Good Scores?

Focal point of the adequacy of scoring deserves emphasis: Reason for all this attention to good scoring is effective performance on the packaging line. Inadequate scores mean resistance by the carton to the folding that takes place in the cartoning operation. An inadequate score can, and very often does, cause jamming of automatic cartoning machinery.

Aside from structural and functional performance of cartons, another phase of score deficiencies is their effect on package appearance. Score cracking on the outside is unsightly and usually results in a break in the printed outer surface, thus exposing the white (or other) color of the board and its fibers. Another point is that, if scoring is not square, thus result-

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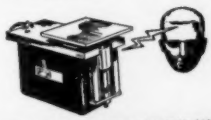

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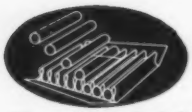
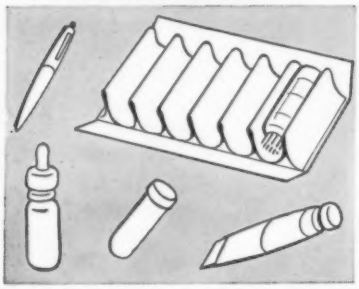


RONDO

"the pack with the built-in shock absorber"

HOLDS and PROTECTS SMALL DELICATE OBJECTS



RONDO is a packing system comprised of trays with fluted partitions which hold inserted objects by a spring-clip action. Typical applications for medical vials, electronic components, pens, crayons, tubes, various tools, etc.

RONDO IS A PAPER PRODUCT, SOLD AT PAPER PRICES

Holds objects from 5/16" to 1¼" in diameter

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Circle No. 254 on Card, Page 89

ing in a carton not square, the printing may be out of register with the carton, thus detracting from carton appearance.

Guard Against Cracking

Again, with a proper score, there is less chance of cracking the outer liner. This is because the scoring process (and subsequently, the folding process) exposes the outer liner to a certain amount of tension. But the better the bead that results from the score, the less the tension on the outer liner. Incidentally, since the inside liner material is under relatively little tension, it is free to move around, and thus assumes the contour of the bead when scoring takes place.

Users and suppliers alike point out that an important point in avoiding score cracking or outer liner damage is to investigate the bending properties of the board selected for a particular carton application. A timely evaluation of bending properties of the board will contribute to maintaining the desired standard of no cracking of outer liners.

Scores Affect Stacking

Still another aspect of good and bad scoring relates to the stacking properties of cartons folded flat. These are important because of their effect on feeding of cartons to automatic packaging machinery. For example, in a side-seamed, knocked-down carton, there are three thicknesses of board at one point, i.e., along the glue lap, in contrast to two thicknesses every place else in the carton.

As a result, if a score is squeezed down too tightly, there probably will be problems in stacking, both at the carton plant and for the feeding operation at the user plant. This is due to the fact that the flattening of a score in each of the cartons in a stack means a high point—caused by the scores not flattened out or that remain normal. The areas of the two scores thus are not of equal cumulative thickness.

Causes Teeter-Totter Effect

This causes a leaning back and forth, and whichever side of the pile has the low point presents the problem. Sometimes the difficulty presents a teeter-totter effect. Likewise, when scores are crushed or flattened on both sides, and the carton has a glued glue lap, there will be a high point in the middle of the stack. This is caused by the tripled thickness of stock at the glue lap. Since the pile is flat on both sides and high in the middle, there is a wobbling action—and poor feeding.

The amount of squeeze on, say, a 180° score, is particularly a problem with a small carton. The difficulty is harder to control when cartons are small and when there are relatively more cartons per unit of stacking height.

Scoring "Language" Needed

Package users frequently complain that part of their difficulty in regard to scores (as well as other aspects of cartons) stems from lack of a thoroughly adequate and wide-

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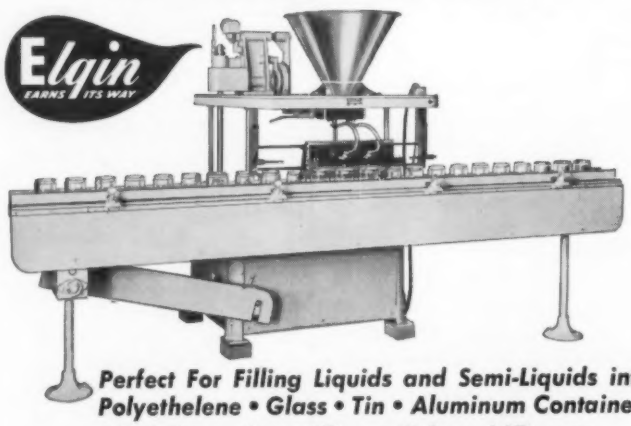

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SPECIALISTS IN PRECISION PACKAGING EQUIPMENT FOR MORE THAN 60 YEARS

ly accepted nomenclature about scores and scoring. Here is an area of unfinished business meriting attention of users and suppliers alike.

This lack of a standard terminology contributes to the difficulty, for example, of knowing how to specify the score for any flat blank carton. Reduced to essentials, the various styles of cartons fall into two main categories, as suggested elsewhere in this article: Those that are flat blanks, such as are used on double package makers (and subject to forming around a mandrel), and those having glued laps which go through a typical automatic cartoning operation. Scores, incidentally, are generally more critical in a glue-lapped carton, in contrast to those of a flat carton for a package maker.

Meeting Individual Needs

Another phase of the general problem of understanding scores and scoring (together with other points of carton making that affect performance on packaging lines) is the relative value which users attach to different carton attributes. This refers to the product's going into the carton as well as the method of cartoning on the line.

For example, one company makes products that are fairly heavy, have some sharp edges, and use much metal, e.g., household utensils. Merchandising needs for these items dictate extensive use of carton stock such as claycoated, kraftbacked board. Because its packaging operations are basically manual, this user is not greatly concerned with bending properties so important to automatic packaging operations.

Rather, such a company has another problem: It needs a carton heavy enough not to fall apart in normal handling, and strong enough so that, if the product gets loose and "rattles around" in the carton, it does not damage the carton. To protect the carton from these relatively heavy products and their surface configurations, it is necessary to use a relatively stiff, puncture-resistant, heavy-caliper board, which brings scoring difficulties.

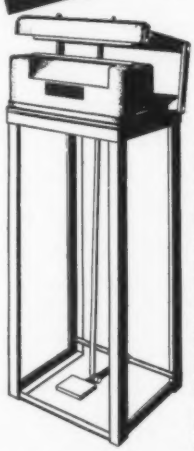
And even with hand-filled cartons, good score lines are essential to prevent cracking of outer liners along score lines. These cracks would impair the attractiveness of the carton to its ultimate recipient.

Scoring Affects Scrap Allowance

Finally, scoring has an effect on the scrap allowances which carton purchasing specifications permit. A typical requirement is that scrap must not exceed 1 per cent. Lack of attention to scoring can boost this figure, as when carton manufacturers let their scoring rules get dull. Excessive scrap due to score cracking may indicate a need for changing the rules in the cutting and creasing dies.

(Next article in this series will continue the scrutiny of manufacturing factors that affect carton performance—with special emphasis on prebreaking.)

NEW WELDOTRON



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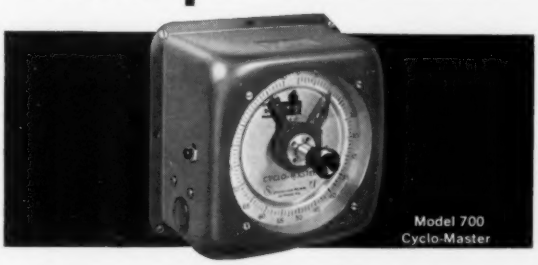

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U.S.I. POLYETHYLENE NEWS

A series for plastics and packaging executives by the makers of PETROTHENE® polyethylene resins

FEBRUARY, 1960 — U. S. Industrial Chemicals Co., Division of National Distillers and Chemical Corporation — 99 Park Ave., N. Y. 16, N. Y.

Packaging Notes

Skin suspension packaging with polyethylene film is being used with great success for shipping pottery and ceramic products.

The packages consist of a low density polyethylene skin suspension on a polyethylene-coated corrugated board. The coated board is perforated to allow a vacuum to be drawn through it. Then, products are placed on the board and 6-10 mil polyethylene film is heated, vacuum formed around the products, and heat sealed to the board. The completed unit is packaged in a corrugated container for shipment.

This packaging technique has cut gross shipping weight by 40%, and in-transit breakage has been reduced by more than 60%.

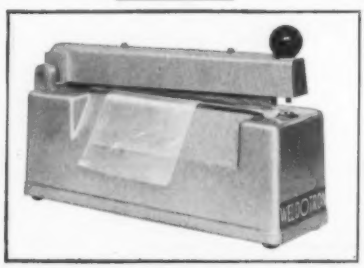
Now... polyethylene packaging for people!

A rectangular-shaped tent of polyethylene film is currently being marketed for use at football games and other outdoor sporting events. The tent is opaque except for a clear polyethylene viewing window. The tent keeps heat in — rain and snow out.

Polyethylene film packaging for carbon-steel tubes has proved to be economical for a New Jersey refinery.

Polyethylene film is wrapped around a cluster of tubes and taped securely closed. Wrapping with polyethylene in this way protects the tubes from rust and corrosion during storage.

Another advantage: packaging cost is said to be one-eighth that of the military-style moth balling the company formerly used.



A polyethylene bag sealer for small lots and laboratory use is now being marketed by a New Jersey Company.

The new compact polyethylene heat sealer is only 4 inches wide and 12½ inches long. It is portable and may be plugged into a standard 110 to 120 A-C outlet. The sealer will produce seals up to eight inches long. Sealing time is one-half to two seconds, according to the thickness of the film.

Improved Film-Clarity Meter Designed by U.S.I. Chemist

New Instrument Eliminates Human Error in Testing Clarity

A research chemist at U.S.I. has designed in conjunction with A.S.T.M. a new light transmittance meter which eliminates human error in testing clarity of polyethylene film. The instrument determines the relative amount of light transmitted through any film specimen at essentially a zero angle of scatter.

This new low-angle light transmittance meter was developed at the Polymer Service Laboratories of U. S. I.

The new meter is designed to replace the optical bench test . . . a method which depended on the operator's eye-sight. With the new meter, test results are recorded automatically, without relying on the judgment of the operator.

Operation of the Meter

Basically, the meter consists of a light source which is concentrated through a sample of film onto a light-sensitive cell. The cell is attached to a galvanometer which measures the amount of light passing through the sample to be analyzed.

Swatches of polyethylene film 1.5 mils thick were used as standard gauge samples by U.S.I. Care was used in handling the samples, since fingerprints on the film could cause variations as much as 10% in light transmittance.

Meters of this type are currently being evaluated by other laboratories in an A.S.T.M. round robin test.

New Polyethylene Packager Cuts Labor Costs by 50%

A west coast manufacturer recently announced a low-cost packaging machine which fills, closes and produces a finished bag in a single operation. It is designed to use bulk rolls of polyethylene film, and packages items which range in size from pencils to shirts.

The machine is said to cut packaging labor costs up to 50% through speed and efficiency of operation. The unit eliminates time-consuming hand loading of pre-manufactured bags. It reportedly eliminates set-up time, since no adjustment is necessary when changing from large to small size bags.

It is also reported that the machine can be operated by personnel who have no previous training or experience in packaging.

Now... Disposable Boots of Clear Polyethylene!

Low in cost, but high in protection are features claimed for newly introduced clear polyethylene boots. These disposable boots are easily pulled over regular shoes, and can be worn open at the top or closed with a rubber band.

Uses suggested for these inexpensive boots include biological and atomic laboratories where control of contaminated elements is vital.

The manufacturer currently packages his product in rolls of 50 and 100, and says average cost is less than 14¢ per pair. The boots are watertight, and last for several hours before wearing through, it is claimed.

Polyethylene Pipe Solves Difficult Tamping Job

Polyethylene pipe has been put to an interesting use in blasting operations for a new Potomac River water treatment plant near Washington, D. C.

A total of 62 holes were drilled to prepare a 110 ft. high cliff for blasting. Fourteen of these holes were from 35 to 96 feet deep and drilled at an angle of 32°. Since the density of the rock formation varied, there was a chance that the bore holes would swing out of line by several feet. Of major concern was the problem of loading and tamping blasting charges to the required depth in the crooked holes. Conventional, non-flexible, metal rods quite obviously would not do the job.

The blasting contractor solved the problem by using 1½" intermediate density hollow polyethylene water pipe. The highly flexible polyethylene tamping "pole" was made up of several sections of pipe.

It easily took the bends in the holes and was used successfully to tamp all required blasting caps and powdered charges in place.

DO YOU HAVE a new polyethylene packaging development you'd like the industry to know about? Make it routine to send your information on new developments to U.S.I. POLYETHYLENE NEWS.

Address the Editor,
U.S.I. POLYETHYLENE NEWS, U. S. Industrial Chemicals Co., Division of National Distillers and Chemical Corp., 99 Park Avenue, New York 16, N.Y.

Announcements of machinery and products

1. Beneath each announcement is a code number. As you select items on which you want more information, *note* this number.
2. Now, *circle* the corresponding numbers on the postcard, Page 89.
3. Next, *fill* in your name and address.
4. Then, *mail* the card — we pay the postage.

Environmental Recording Systems

Santa Barbara Instrumentation Corp. has developed its new ES-102 recording system. Designed

primarily to measure environmental parameters, the ES-102 can be used with any transducing element having contact closures as the output presentation, such as digital accelerometers and temperature end-instruments. System has 24 channels for recording up to 20 events/sec. and one time channel for correlation. Typical system applications are transportation impact and temperature recorders. Data reduction is simplified and electro-mechanical counters can eliminate unnecessary reduction by providing quick access information. Circle No. 1.

Carton Filler

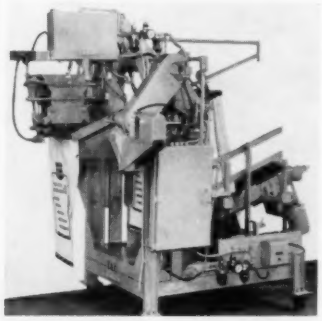
Food Machinery and Chemical Corp.'s Stokes & Smith Plant announces a fully automatic high-speed machine designed to handle the new Calk-Seal carton perfected by Packaging Corp. of America. The hot applied caulking under the Van Buren ears of carton forms a permanently pliable seal to provide moisture barrier; thus eliminating inner-bags and/or overwraps, Stokes & Smith says. At speeds up to 300/min., cartons are snapped open, bottom sealed, filled and top sealed. Calk-Seal strip is then applied and sealing completed automatically. End-opening cartons of practically every type can be handled from 1-oz. to 3-lb. sizes with dimensions from 2⅜x3⅝ in. up to 8x11 in. Circle No. 2.

Drum Filling Cover

Deleware Barrel & Drum Co., Inc. announces the availability of its new polyethylene drum filling cover which is molded of polyethylene with built-in handles and molded pouring lip. This lightweight cover is corrosion-proof, available in 15-, 30- and 55-gal. sizes, will fit all standard fill lines on steel, fibre and polyethylene drums, and has an expandable fill pipe opening. Circle No. 3.

Automatic Bag Hanger

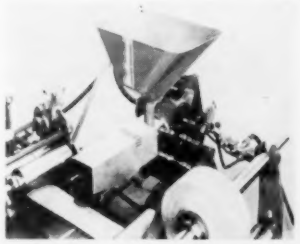
Union Bag-Camp Paper Corp. announces the development of its automatic bag hanger which sup-



plies empty open-mouth multiwall bags to a filling machine and places them on the loading spout. Adaptable to all Union I & C bagger models, this auxiliary machine eliminates the need for a bag filling operator. To operate, any quantity up to 400 bags is placed upright in bag magazine with notches forward. Sensing switches at both top and bottom of leading bag keep it in position to be removed. Bags are moved forward at top by pressure from a "follower" and on either side by elongated sprockets. A curved "picker" opens leading bag by using thumbnotch. Rotating arms next approach opened bag allowing "fingers" mounted on arms to move inside bag. Arms stop momentarily and separate until fingers are snug inside bag. Then sufficient pressure is applied to move bag out of magazine. Circle No. 4.

Adhesive Extruder

Potdevin Machine Co. announces its development of a new hot-melt adhesive extruder designed



for use in carton and bag making involving new wet strength krafts, polyethylene and other surfaces. Easily affixed to standard bag and carton making machines, extruder accepts solid adhesives in hopper, transforms them, as needed, into molten state. Molten adhesive is then applied through nozzle, directly to material to be bonded. Flexible shaft allows Model SE to derive its power from machine on which it is mounted. Web speed controls rate of adhesive extruded—the faster the movement of web, the greater the flow of adhesive. Nozzle is designed to direct adhesive flow as close to nip point as possible. Separate thermostat controls are provided for each of the two sections that are under heat. Machine is equipped to extrude approximately 0.04 gal. (0.375 lb.) of molten adhesive/min. On a volume basis, this would be equivalent to 1,000 ft./min. of ¼-in. wide line 0.003 in. thick, Potdevin says. Circle No. 5.

(Turn page)

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PROGRESS IN PLASTICS

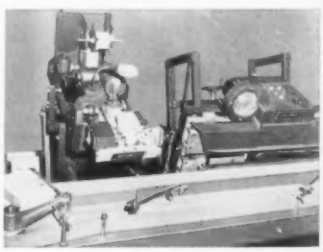
Electric Staplers

Bostitch, Inc. has introduced electric staplers, Models B5E2 and B-5E3 Bostomatic. Model B5E2 is for

fully automatic electric stapling; it automatically drives staples when work is inserted against combination back gauge and switch release. Model B5E3 is semiautomatic; foot- or knee-operated, it is actuated by small switch which may be placed on floor or mounted under table or workbench. Light tap of foot or knee on switch drives staples. Each handles items up to 1/8-in. thick with no adjustment needed for different thicknesses; adjustable stapling gauge can be set to any depth up to 4¼ in. Both machines are loaded through a door on front with 210 standard ¼-in. staples. Circle No. 6.

Labeling Machine

Amsco Packaging Machinery, Inc. introduces an automatic label applicator which affixes pressure-

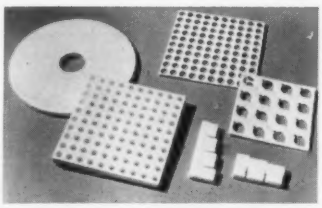


sensitive labels to conveyor-carried polyethylene packages. The unit, Amscomatic 300 Label Applicator, is an auxiliary machine to the Amscomatic packaging method, a conveyorized packaging line for polyethylene packaging with tight-to-product edge seal. Conveyor fed, the Amscomatic 300 accepts package and automatically affixes perforated edge, pressure-sensitized label, and uses labels that are spaced together on backing strip rather than spaced apart. Activated by an electric eye, attachment affixes one label to a package and can handle up to 144 pkgs./min. It carries label

reel with power unwind that enables it to handle jumbo label rolls. Labels can range in size from 15/16 to 1½ in. high and 1 to 4 in. wide. Circle No. 7.

Cushion Packaging Material

Armstrong Cork Co. has developed a new internal cushion packaging material that is white in color.



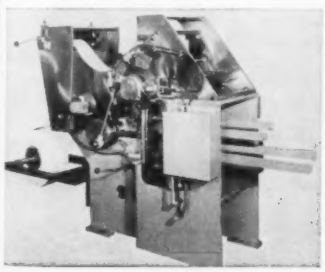
The new plastic material, Resilo-Pak, retains its physical characteristics from −85°F. to +175°F., is dimensionally stable at normal temperatures, has a neutral pH., is non-abrasive, non-dusting and non-hygroscopic. It can be die-cut to form a variety of shapes that previously had to be molded, Armstrong says. It is available in thicknesses ranging from 1/16 to 20 in. in 1/16-in. increments. Circle No. 8.

Screw Feeder And Counter

Mercury Heat Sealing Equipment Co. announces its automatic screw feeder and counter. Feature of screw feeder, says Mercury, is its avoidance of jamming. Variety of screw sizes and heads may be used; it accommodates screws as long as 2 in. and dispenses in excess of 250 to 300 crews/min. Circle No. 9.

Pre-Blanking Press

Emhart Manufacturing Co.'s Portland Div. has developed a new press for blanking thin plastic



sheet, the object of which, Emhart says, is the reduction of scrap. Equipped with a continuous roll feed and automatic scrap cutter, new unit will blank unprinted or printed plastic film at rates of 100 to 150 strokes/min. Maxi-

Just "touch" the carton and there's your label

Weber Touch-Stenciling—the fast easy way to address multiple carton shipments...

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Stencils are pre-cut to duplicate your label. Customer's name and address or product information is filled in on a typewriter or by hand. Then slip the stencil on the handy duplicator and touch-stencil all the cartons in the shipment. The duplicator leaves a clean, sharp print that will not fade, rub or wash off.

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FAST, EASY. Stencils are pre-cut to your specifications. Type or handwrite in the variable data and slip on duplicator. Takes just seconds to change stencils for each order.

Send for free bulletin on Weber "Touch-Stenciling" methods. Packed with ideas on addressing and marking multiple shipments.

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Other Patapar Releasing Parchments provide quick release for foodstuffs such as frozen meats, where ice makes separation difficult . . . plastics, where extreme temperatures and inherent tackiness make it necessary to include the releasing parchment in the production process . . . and adhesive materials, where the product can stick to itself or its user.

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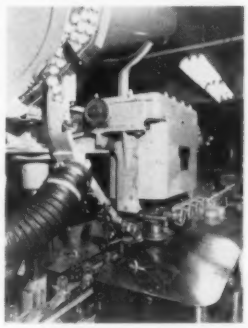
mum width of material is 17 in.; thickness of material for standard unit is up to 1/16 in. Finished blanks are automatically stacked in chutes by machine for transfer to magazines of forming machines. Circle No. 10.

Vacuum Pump Attachment

Resina Automatic Machinery Co., Inc. introduces a new attachment for its automatic screw cappers.



Attachment removes lint, dust and other contaminants from inside bottle caps and fitments as part of regular production operation, and is installed by Resina upon request on new capping equipment. It has a vacuum pump linked by a flexible hose to capper chute. Pump draws on inside of each cap at two points—at bottom of capper's hopper ring and as cap comes down chute. Vacuum created is sufficient to suck in lint, dust and other impurities that may adhere to caps and contaminate product, Resina says. Circle No. 11.

Endless Belt

Dodge Fibers Corp. announces the development of a new Teflon-coated glass endless belt which is chemical and solvent resistant. Called Fluorglas, it has a wide temperature range (−400°F. to +600°F.) with anti-adhesive and anti-friction properties, Dodge Fibers says. It is available in a variety of widths and thicknesses. Circle No. 12.

Electronic Batch Counter

Standard Instrument Corp. announces the re-design of its electronic batch counter, Tally-Count, which can use plug-in sensing devices including warning pre-sets to furnish warning signals before final count is reached, photoelectric amplifiers which convert photoelectric signals into counting pulses at speeds up to 100/sec., and photoelectric sensing units which count and inspect parts without contacting the material controlled. New features: remote

control operation—additional relays in power chassis permit count re-set or control relay release through remote switches; greater counting capacity—addition of a fifth decade increases batch counting capacity to 100,000; automatic zero set—counting tubes automatically set to zero with application of power, insuring complete batch count from the very start of operation, Standard Instrument says. Circle No. 13.

Transportation Simulator

L.A.B. Corp. announces the availability of its new Conbur (incline-impact) transportation simulator with 400-lb. capacity. Type 400-CM-116 Conbur machine supports load carrying dolly on a simple track. Dolly is equipped with rubber-tired wheels to reduce clatter and rattle. Enclosed barrier is optional. Use of ballast minimizes the transmission of impact forces into surrounding floor areas and permits operation of machine without bolting to the floor. Enclosed barrier consists of longitudinal steel plates which form the major shock absorbing members with a metal plate enclosing back and a 1-in. thick sheet of plywood forming the barrier striking face. Circle No. 14.

Case Opener-Former-Positioner

Crompton & Knowles Packaging Corp. has developed a mechanical or pneumatic case opener-former-

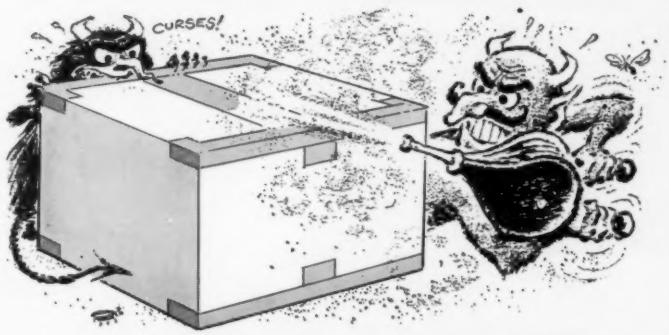
positioner with discharge used for setting up knock-down corrugated shipping cartons, positioning them to receive cans from a packer, and discharging filled case. Unit features adjustable length and width gauges, positive case feeds, and production rate up to 40 cases. Loaded with flat cases, machine opens case and places it in side position to receive up to 24 cans at a time from a packer. After filling, cases right themselves and pass by conveyor system to closing and sealing equipment. Circle No. 15.

Five-Gal. Flaring Pail

Continental Can Co. has developed a new, leakproof, 5-gal. flaring

Only gummed tape is—

DUST, DIRT, VERMIN-PROOF!



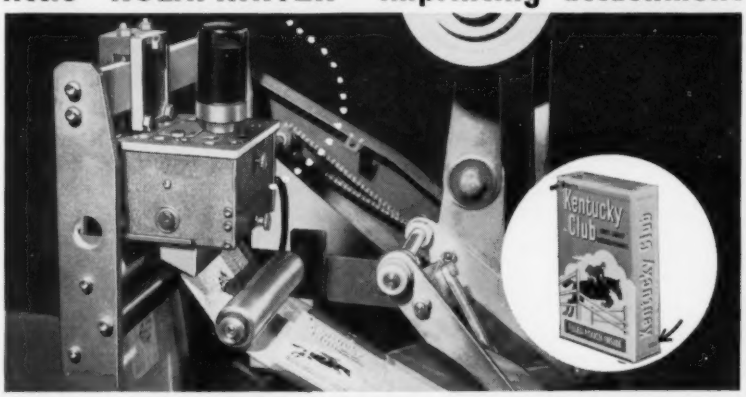
only tape gives you really safe closures!

DARLING'S Improved BONE GLUE

DARLING & COMPANY
GLUE DIVISION
4201 South Ashland Avenue, Chicago 9, Illinois
Suppliers of Animal Bone Glue to Gummed Tape Manufacturers

For more information circle No. 263 on Reader Service Card, Page 89

No wrapping machine is complete without this little "ROLAPRINTER"® imprinting attachment



Buying a new wrapping machine? Order it with a Gottscho "ROLAPRINTER" factory-installed. Adds little cost, big advantages.

Amazing "ROLAPRINTER" unit lets you imprint the package as your products are wrapped — automatically — with no direct labor cost. Cuts packaging costs, speeds production. Has a dozen uses — for imprinting codes, prices, weights, sizes, product names, promotion specials, block-outs, even complete designs. Attach it yourself on any wrapping, bundling, bag or pouch machine. Makes good legible imprints consistently with instant-drying fluid ink. Foolproof — requires no adjusting, no attention during operation. Over 1000 in use.

For full details write for "Bulletin RIN-8"

First and foremost in automatic production-line CODING, MARKING and IMPRINTING machines. Gottscho®

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For more information circle No. 264 on Reader Service Card, Page 89

HOBBS 44" "Versawind"

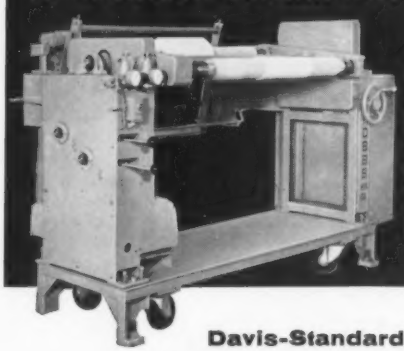
with Model 25T
Davis-Standard
Thermatic* Extruder
in film winding operation

More For Your Winding Money!

44" Hobbs "Versawind" at Davis-Standard A CLASSIC EXAMPLE!

Hobbs *does* give you more for your winding money and here is proof positive!

The 44" Hobbs Versawind shown here is joined to a Thermatic Extruder, Die and Blown Film Tower manufactured by Davis-Standard, a division of Franklin Research Corporation of Mystic, Connecticut. Operating on a 5-day a week basis, the unit tests batches of thermoplastics sent in by extruder customers and runs pilot extruder tests.



Davis-Standard reports

"We selected this Hobbs winder because, in addition to the greater output that it permits, we get more control and range, which are essential for our testing purposes. Every batch of material we run requires a slightly different set-up and the Hobbs Versawind adapts quickly to whatever the tolerance requirement may be."

In fact, Davis-Standard is so confident that Hobbs is the best film winding machine for the money that it offers its famous "Thermatic" Extruder, Die and Blown Film Tower and the Hobbs Versawind as a packaged assembly.

Hobbs builds winding drives and stands from the ground up to best fit your requirements. Hobbs manufactures all types of web winding equipment with all types of winding drives, stands and tension controls (electrical, mechanical, hydraulic, etc.). *Patented

EST. 1892 HOBBS MANUFACTURING COMPANY

Ask for "Principles and Practices of MODERN WINDING." A copy is yours on request. Get More Winding For Your Money!

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Representatives in Irvington, N. J., Chicago, Cleveland, Greenville, S. C., Louisville, Los Angeles, Toronto and other Principal Cities

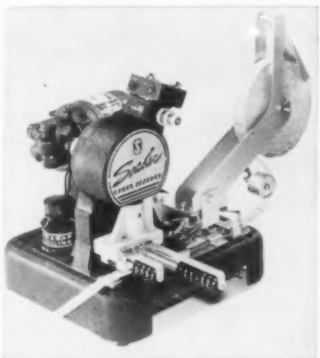
475-D

WINDERS • WINDING STANDS • HAND & POWER SHEARS
SLITTERS • AUTOMATIC CUTTERS • DIE PRESSES

pail with a one-piece, one-seam, electrically welded body construction. Continental says the single, electrically-welded seam provides a positive, leakproof seal. Offered in 29-gauge steel, pail is made by new method of manufacture—body is first formed and welded into straight sided shell. Shell is then placed in machine designed to stretch metal into the flare. Beads near top and bottom contribute to rigidity of the body and a compound-lined bottom with a 5-thickness seam adds extra strength, Continental says. Circle No. 16.

Label Marker

Soabar Co. introduces its new Model 20W label marker that features a newly-designed turn wheel



register which offers two lines of dial marking—up to 7 characters /line. It also allows for one line of type at top of label for relatively constant information such as season coding, department numbers, etc. Unit marks sew-in, pressure-sensitive and gummed labels, up to 1x1⅞ in. size. Turn wheel register is made with wheels that are steel engraved. Circle No. 17.

Penetration/Sizing Tester

Testing Machines Inc. announces its photoelectric, penetration, and sizing tester for paper for measuring absorption of a colored liquid, (usually a standard ink) into the test specimen. TMI Pen-A-Size Tester is a patented system of balanced photoelectric cells in combination with a filter screen of known value. By twisting a knob, ink is applied to under surface of specimen and automatic timing begins. A digital read-out timer with 1/10-sec. sensitivity automatically stops when penetration of liquid ink has reduced reflectance of upper surface of test specimen to an amount equal to the calibrated screen. Circle No. 18.

Beer Packer

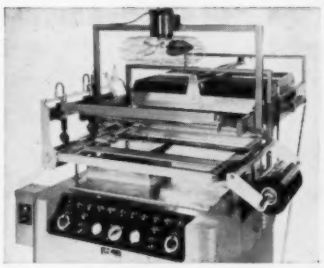
Container Corp. of America has developed a new machine for its new Glass Band beer carton. As many as 60 six-packs/min. can be loaded by unit. Pre-printed carton blanks are fed automatically. Machine forms and inserts partitions, wraps 12 bottles in one operation. Locks and glues the closure, forms and glues two corner posts in each six-pack to retain end bottles in carrier, breaks the 12-pack into 2 six-packs, inserts a cross pad between the six-packs, loads the 4 six-packs and cross pad into a tray or regular slotted carton. Circle No. 19.

Bread Loader

Plas-Ties Co. announces the development of a new stainless steel bread loader for packaging bread in polyethylene bags. The trough-like bread loader is attached to a packaging table and is self-cleaning so that crumbs fall away from the bread loader automatically. In operation, loaf of bread is placed in the loader after which a polyethylene bag may be slipped over bread and loader. Bread is pushed up into bottom of bag and bag and loaf are removed from loader, and bag is ready to be closed. Circle No. 20.

Automatic Feed Attachment

Comet Industries has announced the availability of an automatic feed attachment for its Comet



Meteor, a low-cost, drape-type thermoforming machine. Attachment is available on new Meteor machines or can be added to equipment now in the field. It completely automates the machine, Comet asserts. Basic features are: automatic loading and unloading of clamp frame; feeding of roll stock automatically; after forming web is slit into strips, separating blisters or skin packages. Meteor itself is made in 4 standard size mold areas—20x30 in., 30x36 in., 36x60 in., and 48x72 in. Circle No. 21. (End)

Test your Aerosols!

Automatically in ISLAND'S new HEAT and LEAK TEST TANK

Stainless steel Rex Table-Top chain, available in various widths for single or double lines of cans . . . and the cans are prevented from slipping on the incline and decline by magnets attached to the chain track. The tank itself may be constructed in hot dipped galvanized or stainless steel, and the unit serves as both a heat and leak test tank.

Dept. PE 2

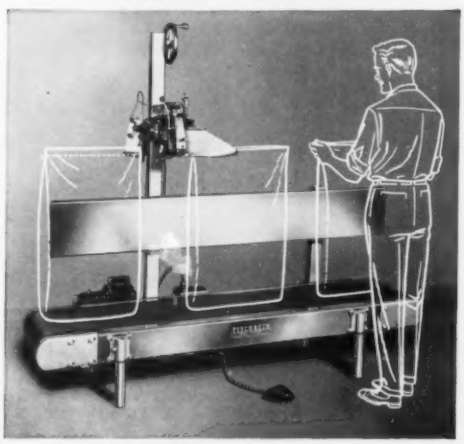
Write for detailed bulletin

ISLAND EQUIPMENT CORP.
P. O. Box 38-276, Miami 38, Florida

Circle No. 266 on Card, Page 89

FISCHBEIN LOW COST EFFICIENT

BAG CLOSING EQUIPMENT



AUTOMATIC MODEL BA-6

Bags start the sewing operation when they reach the head. After sewing, thread is cut automatically and conveyor belt continues to move bag. Instantaneous start/stop controls.

FISCHBEIN *Portable* BAG CLOSER MODEL C

FASEAL

TAPE BINDING ATTACHMENT

- Produces perfect tape-bound closures.
- Complete portability maintained.
- Can be quickly removed when tape-binding is not required.

- Total weight, only 10½ pounds.
- Requires no installation, supports or plant space . . . merely plug into any electrical outlet.
- Handles all textile and paper bags.
- Closes average 100 lb. bag in less than 6 seconds.

Write for complete Catalog File of Bag Closing Equipment.

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1. Beneath each announcement is a code number. As you select items on which you want more information, *note* this number.
2. Now, *circle* the corresponding numbers on the postcard, opposite this page.
3. Next, *fill* in your name and address.
4. Then, *mail* the card — we pay the postage.

Wrapping Machines

Battle Creek Packaging Machines, Inc. offers two illustrated data sheets and a 4-page brochure describing its line of wrapping machines. Included is an overwrapper which can use soft plastic films at speeds up to 75/min.; a wrapper which will handle cakes, cookies, small articles on bottom cards, textile products or meats; and a bundle wrapping machine. Circle No. **101.**

Plastic Trays

National Packaging Corp. has two illustrated brochures describing its line of multiple unit plastic trays which are vacuum formed to fit the shapes of specific products, permitting completely automated packaging and filling of candies, cookies, fruits, electronic parts, cosmetics and other products. Circle No. **102.**

Molded Cushioning Paper

Kieffer Paper Mills has a 16-page illustrated booklet on its Schocksorb, a molded cushioning paper. Advantages and comparative costs of Schocksorb are described for packaging drugs, cosmetics, instruments, metallic finishes, furniture, etc. Booklet is also bound in Schocksorb. Circle No. **103.**

Silicone Paper Coating

Dow Corning Corp. has a 4-page illustrated brochure describing a permanent, water-repellant silicone paper coating which prevents adhesion of sticky products to paper and paperboard. Circle No. **104.**

Packaging Machine Clutches

Curtiss-Wright Corp., Marquette Div., offers a 36-page catalog describing 5 series of clutches that can be used on packaging machinery. Complete specifications, detailed operating photographs and prices are included. These units are designed for control involving over-running and back-stopping, indexing, etc. Circle No. **105.**

Paper And Foil Coatings

Interchemical Corp.'s finishes division has 2 folders containing technical bulletins describing a wide variety of packaging coatings for labels, fibreboard, folding cartons, foil, sanitary packaging and heat-sealing applications. Circle No. **106.**

Heavy-Duty Corrugated

Stone Container Corp. offers a 4-page illustrated folder and sample of its heavy-duty, humidity-resistant corrugating medium, Stone-Cor, for shipping containers. Laboratory tests are reported, showing that 200-lb. test single-wall corrugated box with special medium exceeds (by 33 to 77 per cent) stacking strength of 200-lb. test regular box. Chart shows advantage of 200-lb. special board over 275-lb. regular board. Circle No. **107.**

Semiliquid Bulk Container

Sealright Co. has available a folder describing, in outline form, its Sealkan. Among the points covered are: size; liquid tightness; weight; ease of handling, filling and assembling; surfaces and coatings available; strength; cost; production rates; space required, and uses. Circle No. **108.**

Package Testing Machinery

Testing Machines, Inc., has available a folder containing bulletins of all the testing machines it manufactures and distributes. These number in the hundreds and include impact, stress and strain, compression, and crush testing machines among others. Prevailing prices are included. Circle No. **109.**

Glass Coating

Thatcher Glass Manufacturing Co., Inc. offers an 8-page booklet. "A protective coating for returnable bottles." In addition to a description of Nu-Glas process for production line coating, the booklet discusses the structure and surface of glass and the purpose and types of coatings used. Circle No. **110.**

Weighing And Filling Machine

The Trescott Co., Inc. has a bulletin on its Trescomatic machine, which is adaptable for weighing and filling any dry, free, or semifree flowing material, including food, drug, chemical, and hardware products. Most types of containers may be used in weights from 8 oz. to 25 lb. Weights and products can be changed rapidly. The bulletin is illustrated and contains specifications. Circle No. **111.**

Package Sterilization

Wilmot Castle Co. is offering a 12-page brochure outlining its complete program on package sterilization. Types covered are steam, dry heat, and gas sterilization by inerted ethylene oxide. In addition to discussing how they research a product and package, engineer procedures and direct installations, they also list a number of products normally requiring sterilization and the method generally recommended. Circle No. **112.**

Transistorized Electronic Counter

Veeder-Root, Inc. has an information sheet describing and giving specifications for its electronic predetermining counter, Series 1604, Model R. Unit can be furnished with photohead to match specifications and is designed for operation by nontechnical personnel. It is transistorized and operates at speeds up to 500 counts/sec. Circle No. **113.**

Cellulose Sheeting

Eastman Kodak Co., Cellulose Products Div., offers a 4-page bulletin, "Properties of Kodapak sheet," a thermoplastic cellulose ester sheet. Graphs and charts outline the physical properties of the three available types. Circle No. **114.**

Single-Structure Carton

Packaging Corp. of America has published a 4-page descriptive folder on its carton sealing process called Calk-Seal. It represents an economical method to make folding cartons sift-proof and infestation-proof. Such cartons eliminate inner bags and overwraps, and cartoning machines are available that will handle this package at speeds of 100 or 300/min. Several paperboards are available. Circle No. **115.**

Automatic Case Packer

Miller Hydro Co. offers a 4-page brochure that describes a case packer that is air operated, electrically controlled. This machine can handle jars, bottles, cans or flasks and containers made of glass, metal, plastic or paper. Several detailed photographs show the step-by-step operation of this machine. Circle No. **116.**

Industrial And Specialty Tissues

The Crystal Tissue Co. offers a fact file with sample swatches of basic tissue types which are available for industrial, converting, and specialty applications. The file outlines, describes, and illustrates the characteristics of each type of tissue, explains how new tissues are developed for special requirements, and provides lists of examples of standard and unusual uses. The file is punched to fit a 3-hole notebook. Circle No. **117.**

Transparent Vinyl Film

Clopay Corp., plastic films division, offers an information and technical data bulletin describing Clopane, a clear vinyl film. Available in 10 different thicknesses ranging from 0.00075 to 0.0100 in., this material, Clopay says, prints well, is tough, can be heat or adhesive sealed, is moisture- and crack-proof, and can be sewn or stapled. It is suitable for packaging textiles, hardware, toys, etc. Bulletin contains price sheets, a yield chart, and a table listing chemical and physical properties. Circle No. **118.**

Corrosion-Inhibitor Paper

Cromwell Paper Co. has available a brochure on its Ferro-Pak, a paper designed to prevent rust by means of a volatile invisible gas which it emanates. Uses of Ferro-Pak in outdoor storage, and estimated costs are included. Circle No. **134.**

Half-Depth Uncaser

Atkron, Inc. has available a 6-page bulletin, HD-200, which explains and illustrates high speed, automatic uncasing of 6- to 32-oz. bottles from 3- and 4-wide half-depth cases, from all cardboard and most metal carry-home cartons. It includes sections detailing design, operation, production and engineering features; safety controls; typical installations; and dimensional data. Circle No. **135.**

Coding Attachments

Bell-Mark Corp. offers a catalog sheet with drawings and model specifications on its line of coding attachments. Attached to conveying or packaging machinery, units place code date, price mark, carton identification or other information on cardboard, paper, metal or plastics. Imprint size ranges from ½ to 3 in. Circle No. **136.**

Automatic Bagging Scale

Richardson Scale Co. has published a new six-page booklet on its E-50 automatic bagging scale. With four photos and six cut-away line drawings, this booklet, No. 3749B, details the E-50's design, capacities, gravity or power feed operation, and discharge. Its high-speed accurate net weighing of almost all ma-

Sticking Problems?

use

SLIPICONE

silicone release agent

ON ALL PACKAGING AND LABELING EQUIPMENT

SLIPICONE® makes sticky spots slick . . . prevents adhesives, packaging materials, foods and food products from sticking where they're not wanted. SLIPICONE keeps equipment clean, cuts downtime and maintenance costs, speeds operations . . . SLIPICONE saves you time and money!

SLIPICONE is nontoxic, won't attack any surface, and is unaffected by temperatures from —40° to 400° F . . . won't gum-up or run-off equipment when heated. Try SLIPICONE, the Dow Corning silicone release agent, now . . . and give your sticking problems the slip!

Write for list of SLIPICONE distributors . . . Dept. 5202.

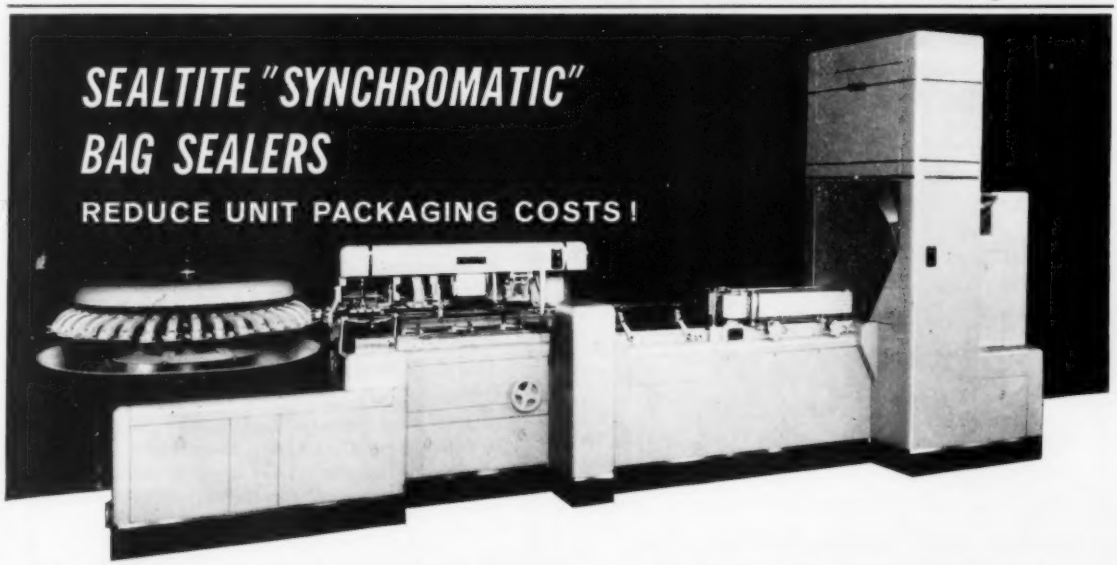
Just spray or wipe it on: Sold in 12 oz. aerosol cans, 2 and 8 oz. tubes, 10 lb. cans.

first in silicones

Dow Corning CORPORATION
MIDLAND, MICHIGAN

For more information circle No. 268 on Reader Service Card, Page 89

SEALTITE "SYNCHROMATIC"
BAG SEALERS
REDUCE UNIT PACKAGING COSTS!



SEALTITE uses any standard gusseted bag—fills 30 to 50 a minute—and seals them with uniformly glued, prescored, double folds.

Packages are delivered well settled and neatly squared at top, bottom and sides. Stack easily. Sift-proof uniform closure on all bags. Seals are strong and tamper proof, yet readily opened. A tailored package fitted to the contents and with maximum merchandising value.

Users report that *Sealtite* reduces costs considerably per month per machine. It will pay you to investigate. For complete information write:

CONSOLIDATED PACKAGING MACHINERY CORP.
A Subsidiary of International Paper Company
BUFFALO 13, NEW YORK

Need a tissue you can *heat seal?*

Here's a tissue specially treated to seal itself under heat and pressure. Applications? Autoclaving . . . pouch packages (it's strong and readily adaptable to high speed automatic pouch packaging machinery) . . . many more. Crystal develops tissues of every type that can be twisted and woven —laminated to films and foils—impregnated —you name it. Send the coupon to get technical information.

First name in tissues for over 60 years

Crystal®

The Crystal Tissue Company, Middletown, Ohio

I want samples and more information on Crystal Tissues for special applications. PE 260

*Name*_____

*Title*_____

*Firm Name*_____

*Address*_____

*City*_____ *Zone*____ *State*____

LERMER PLASTIC CONTAINERS

Exceptional printing makes the difference...

Helps make the sale!

- Printed or decorated up to 4 colors on crystal clear, transparent or opaque colors
- Largest line of RIGID plastic containers
- 1/5 the weight of glass—greatly reducing ever-increasing shipping and handling costs
- Lightweight and shatterproof—with rigid wall protection
- Economical—with customer re-use value
- Also made of new high density polyethylene—Poly-Opal*. Are chemically inert, stain resistant and have lower permeability to moisture and gases than conventional polyethylene.

*T. M.

Write for full-color catalog, samples and prices.

LERMER PLASTICS, INC.

540 South Avenue
Garwood, New Jersey

PIONEERS AND SPECIALISTS IN PLASTIC CONTAINERS SINCE 1919

Circle No. 270 on Card, Page 89

Circle No. 271 on Card, Page 89

terials packaged in open-mouth paper or textile bags is also described. Circle No. 137.

Heat-Seal Papers

Brown-Bridge Mills, Inc. offers a booklet of test sheet heat-seal papers designed for cellophane, Pliofilm, Mylar, saran, and for delayed or instantaneous action. They are available coated on a variety of papers, and designed for automatic machine or hand application. Circle No. 138.

Tear Strip Machine

Charles Beck Machine Corp. has published a data sheet describing its tear stripper. Machine features continuous rotary operation in application of tear strips to web material at speeds up to 120/min. Circle No. 139.

Rotary Piston Filler

The Pfaudler Co. offers Bulletin 959, providing specifications for a 21-station rotary piston filler. Illustrations of mechanical drawings are employed to describe this unit. This machine packages viscous or semi-solid products at speeds up to 500 cans/min. Its accuracy is rated at (±) fl. oz. This machine features a high-speed no container-no fill mechanism and a simplified changeover for different can sizes. Circle No. 140.

Counting And Imprinting Machine

Pitney-Bowes, Inc., offers two pieces of literature describing the Tickometer, a counting and imprinting machine for automatically counting, dating, coding, and imprinting labels, tags, cartons, and so on, at speeds from 500 to 1,000 pieces/min. A 10-page brochure, "Your employees' time is too valuable to waste," gives specifications and operating features of this machine. A separate bulletin of 12 case studies of savings attributed to the use of this unit is also included. Circle No. 141.

Machinery Catalog

Pneumatic Scale Corp., Ltd. has available Bulletin 139, a tab-indexed booklet, illustrating typical machines in its line. Equipment covered includes machines for: forming and weighing, closing and wrapping combinations, air cleaning, capping and cap feeding, powder and liquid filling, labeling and synchronized lines. Illustrations and short descriptions are given, along with a reference to more detailed bulletins offered on specific machines. Circle No. 142.

Polyflex Film

Plax Corp. has a folder on its oriented polystyrene film, Polyflex. A 0.002-in. sample of the film is included which visually demonstrates its clarity and ability to stay flat. Many characteristics are listed, including machinability, dimensional stability and savings compared with other packaging films. Circle No. 143.

Counter/Batcher For Small Parts

Post Machinery Co., electronics products division, offers a bulletin on its high-speed automatic counter-batcher, Model FCB-1. Adaptable to small parts, tablets, hardware, and so on, this portable machine counts up to 5,000 parts/sec. Circle No. 144. (End)

Have full control of military packaging

(*Continued from Page 35*)

written procedures. Damaged material, not possible to detect until the package is finished, can wreck packaging efforts and be quite costly to the contractor.

Does Supplier Get Full Picture?

Are there pitfalls in allowing the packaging material broker to design the package? Many! But there is one that has been brought to our attention which had serious consequences for the contractor. Fortunately, for us, it did not happen at our company.

One supplier, apparently seeking to help a contractor, recommended a larger but cheaper set of blocking material. It met the specifications and did the job well. Blocking costs dropped from $1.65 to $1.02. Thus the contractor was apparently going to save $63.00 per hundred packages. The contractor was elated and quickly approved.

What he did not immediately realize was that the cheaper but larger blocking increased his package size considerably. The increase in case size resulted in a very real increase in cost. This was a Method IIb package: Carton, barrier carton with a case liner, and wooden box added. Everything but the blocking costs skyrocketed. What happened was frightening to our cost-conscious manufacturer:

	Original Pack	New Pack	Saved
Blocking	$1.65	$1.02	$0.63
Desiccant	3.90	4.68	0.00
Inner Carton	1.58	1.93	0.00
Barrier	2.95	3.42	0.00
Outer Carton	1.84	2.26	0.00
Case Liner	1.33	1.59	0.00
Wooden Box	4.60	5.84	0.00
TOTAL	$17.85	$20.74	—$2.89

(*Continued on Page 96*)

POST DECITRON ELECTRONIC PRODUCTS

MODEL K-5 — Multi-Purpose Electronic Control counts up to 1000 units per minute

POST'S K-5 control features a hermetically sealed solid state photocell which lasts indefinitely. Relay is a single pull, double throw type, DC operated for maximum reliability. No vacuum tubes to short circuit or burn out . . . little service required. Rugged enclosures are provided for both light source and receiver and input voltage may be supplied from any 115 V outlet.

The K-5 may be used as an on-off control, go-no go control, or for many other applications including safety devices, liquid level or illumination control limit switch or jam detection sensing.

Write for bulletin K-5.

Decitron

ELECTRONIC PRODUCTS DIVISION

Post Machinery Co. | 159 Elliott St., Beverly, Mass.

Structural design notes for corrugated containers

Note No. 13: Compressive strength of boxes—Part III

By K. Q. Kellicutt, *Engineer, Forest Products Laboratory, Forest Service, U. S. Department of Agriculture, Madison, Wisconsin*

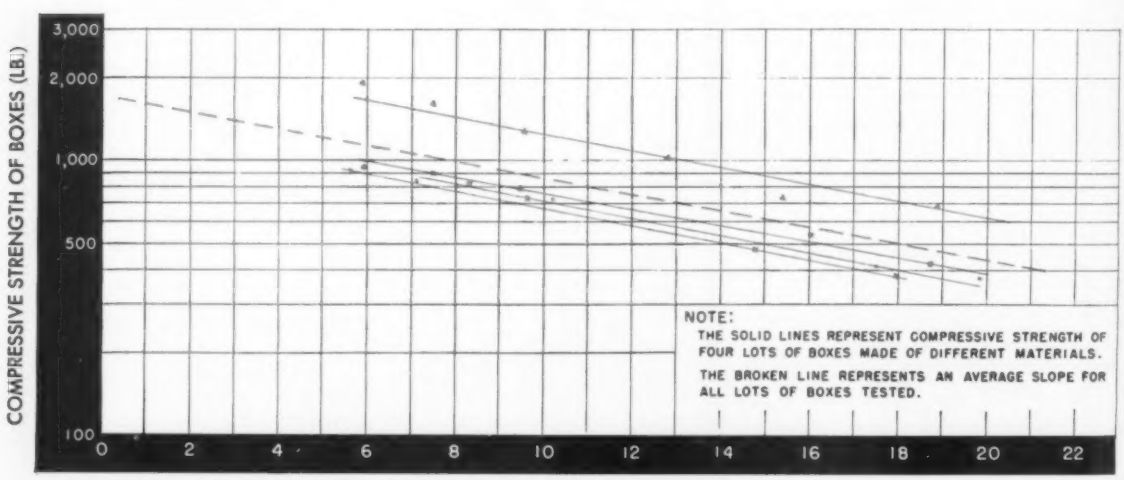
Introduction. It is well known that the adverse effect of moisture on the compressive strength of corrugated boxes has been the greatest single influence limiting their use. Some progress has been made in the development of treatments for the paperboard components, or for the finished box, so that part of the dry stiffness is retained when the box is wet. Generally, the treatments that have been developed are effective only in that they retard the absorption of moisture by the highly hygroscopic wood fibers of the corrugated box. This is especially true when the treated boxes are subjected to liquid water for short durations.

But, when the boxes are subjected to high humidity for prolonged periods of time, water vapor eventually reaches the fiber with the result that compressive strength is reduced. These compressive strength reductions, on a percentage basis, are generally the same for the treated boxes as for the untreated ones. The advantage of the treatment, however, is the moisture protection the treatment provides for the short exposures to either liquid water or to conditions of high humidity.

FPL has demonstrated that kraft paperboard can be modified with water-soluble phenolic resins to attain some protection against water. It was found that the addition of the resin decreased the equilibrium moisture content at all humidities as well as the rate of adsorption of moisture (*1*). The addition of sufficient quantities of resin to obtain water resistance and increase stiffness is expensive, of course, and adds appreciably to the cost of manufacturing the board. Hence, it has generally been considered more feasible to use heavier paperboard components and water-resistant adhesives in order to have stronger boxes under adverse moisture conditions.

Relation Of Moisture Content Of Fibreboard To Compressive Strength

The influence of moisture content of corrugated containers on compressive strength is quite different than it is on other physical properties of the board. For example, back in the early thirties, Seborg,

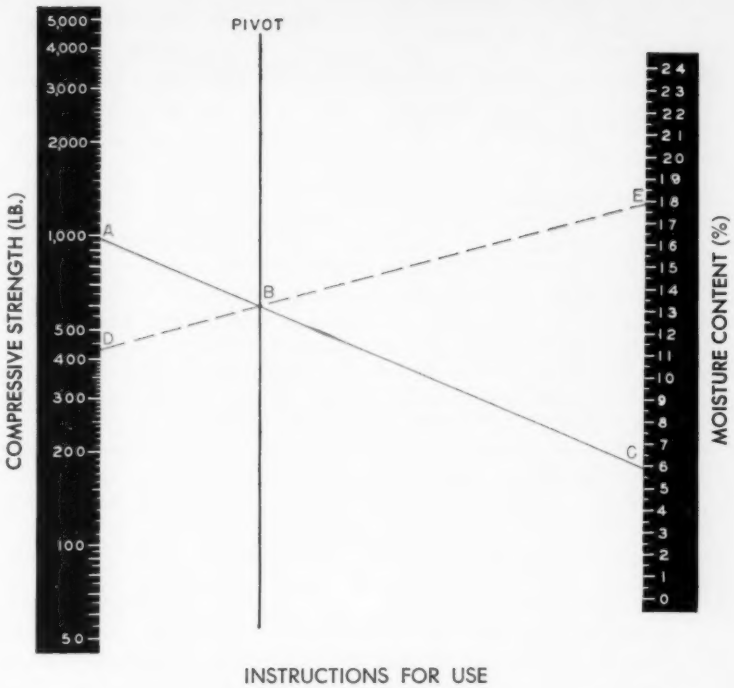


1 INFLUENCE OF MOISTURE CONTENT of fibreboard on compressive strength of boxes. Broken line represents box with compressive strength of 1,516 lb. at 0 per cent moisture content.

Doughty, and Baird (*4*) showed that both the moisture content and the bursting strength of container boards change with relative humidity in a regular way, and they exhibit hysteresis as the relative humity is changed through a complete cycle. With these changes, they found that the bursting strength increased with increases in moisture content, and the maximum is attained at a moisture content of about 6 per cent which corresponds roughly to 40 per cent relative humidity on adsorption and 30 per cent on desorption. For moisture content value between 6 and 12 per cent, the bursting strength fell off gradually, but above the 12 per cent moisture, the fall off in bursting strength was very rapid (*4*).

Later, in conjunction with drop tests of corrugated containers, a somewhat similar relationship was found between the moisture content of corrugated containers and their resistance to rough handling (3). In this work, it was found that the maximum resistance to impacts received in the drop test resulted when the moisture content of the corrugated boxes was considerably higher than for burst, or about 20 per cent. But, for moisture contents below and above the 20 per cent value, the resistance fell off rapidly in a manner similar to that occurring for the bursting test.

In resisting compressive forces, the situation is quite different from what it is for the bursting strength or impact resistance. Here, it may be shown that corrugated containers have the most resistance and exhibit the greatest amount of stiffness when their moisture content is at the lowest level. From that point, with each increase in moisture content, there is a corresponding decrease in compressive strength. After a certain point is reached, the box virtually becomes a bag whose function it is to hold the contents of the box together. This results, of course, only if water-resistant adhesives were used in fabricating the board from which the box was made. If water-resistant adhesives were not used, there would be a complete delamination of the components when the container is subjected to liquid water or high humidity.



2 **CHART FOR CONVERTING TOP-TO-BOTTOM COMPRESSION STRENGTH** of corrugated boxes at one moisture content to strength at another moisture simplifies use of this relationship.

The relationship between compressive strength and moisture content was established, and it can be expressed by a formula. This was done after it had been shown that boxes made from different materials reacted in essentially the same way for specific increases in moisture content. This may be seen from Fig. 1, which is a plot of the compressive strength of four lots of boxes for various moisture contents in a range from about 5½ to over 18 per cent.

The line for each kind of box is oriented in respect to the other straight lines in accordance with the respective strength for the specific kinds of boxes, and all lines are essentially parallel. For all practical purposes, the slope of the lines can be represented by the broken line shown. A formula, based on the representative broken-line curve, expressing the relationship of compressive strength of boxes to moisture content of the fibreboard, was derived to facilitate the use of the data. The broken-line curve represents a box that has a compressive strength of 1,516 lb. at 0 per cent moisture content. The strength of other boxes at all moisture contents will be represented by parallel lines that intercept $x=0$ at various compressive strength values.

This relationship may be expressed by the equation

$$Y = b\,(10)^{mx}$$

in which Y = compressive strength of box, in pounds; b = compressive strength at 0 per cent moisture content; m = average slope (determined to be -3.01); and x = moisture content (for purposes of this equation, moisture content must be expressed as a decimal, determined by dividing the weight of water by

the ovendry weight of fibreboard).

The compressive strength of a box at a specific moisture content may be found by relating the box to another for which the compressive strength and moisture content are known, thus,

$$P = \frac{P_1 (10)^{3.01 x_1}}{(10)^{3.01 x_2}}$$

in which P = compressive strength to be determined, in pounds; P_1= known compressive strength in pounds; x_1 = moisture content for box with P_1 compressive strength; x_2 = moisture content for which the compressive strength is to be determined; 3.01=slope of curve.

For easier use of the relationship an alignment chart was constructed from which the compressive strength of boxes at one moisture content can be readily interpreted in terms of another. The chart and instructions for its use are included in Fig. 2. The example indicated by the lines on the chart shows that the compressive strength of 1,000 lb. for a box at 6 per cent moisture content is reduced to 430 lb. when the moisture content is increased to 18 per cent.

The relationship between compressive strength and moisture content as shown by the chart has been found to be reliable when applied to component paperboards and built-up corrugated board, as well as single-wall, double-wall, and triple-wall boxes.

Reaction To Moisture Change Is Rapid

No attempt has been made to establish the rate of change of moisture content in corrugated boxes subjected to changing atmospheres, but two simple examples will illustrate that changes start instantaneously. This fact becomes apparent when ovendry samples of corrugated material are weighed for the purpose of determining moisture content. When a specimen is removed from the oven onto a balance located in an atmosphere in which the relative humidity is 50 per cent or more, the specimen picks up moisture so rapidly it is difficult to get the exact specimen weight.

The second example involves some duration-of-load tests that are now in progress. In these tests, the objective has been to determine how rapidly the sudden exposure to a high, humid atmosphere affects the ability of the box to sustain a dead load. For the test, boxes were conditioned in a standard atmosphere maintained at 73°F. and 50 per cent R.H., and sealed in a flexible water vapor barrier under those conditions. The box thus protected was then placed in an atmosphere of 80°F. and 90 per cent R.H., and a load placed on it that was 50 per cent of the maximum machine test load that similar boxes attained in a testing machine. Ordinarily the box would sustain the dead load, equivalent to 50 per cent of the machine test load for 1 yr. if the atmosphere did not change to one of higher moisture (2).

After about 48 hr. had elapsed, the water vapor barrier was opened so that the box was exposed to the 90 per cent R.H. In one test, the box failed in 44 min. after exposure to the 90 per cent R.H.; in a second test, failure occurred in 1 hr.

These tests will be discussed in greater detail, with a variety of others, when the work has been completed. They are mentioned here only to emphasize how rapidly the effect of moisture becomes apparent.

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(End)

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(Continued from Page 93)

Savings May Be Illusory

True, $0.63 per package was saved on *one* part of the package, but it cost $2.89 in additional material cost to convert to this new and "cheaper" package. Both were, of course, proper and equally acceptable. To add further insult, the awkward physical form increased the labor cost. This recalls the old proverb, "Penny wise, pound foolish," which is just as applicable today as ever. The comparison study was given up in disgust when they investigated the higher freight charges and handling cost. Simply put—they had been taken!

An added ingredient we have found important in making "our" program work is teamwork. Everyone works as a team: Engineering, packaging, shipping, inspection, Navy inspection, purchasing (and our suppliers) as well as management. All have a single goal—to do the job right: To package the equipment so it arrives ready to go to work as a vital tool in our national defense. *(End)*

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What we think

These four urgent needs demand our attention now

About this time each year (and especially at the start of a decade), we usually have all sorts of professional and amateur prophets gratuitously trumpeting their predictions about our immediate and distant economic future. While these are helpful in giving us a sense of direction, they usually have the inherent disadvantage of generality.

So—let's try to cut through all this and get down to practical terms. Our talks with people throughout the technical and operational packaging field convince us that four points deserve priority attention—and the sooner the better:

Can we do something about these—this year?

1. More research on packaging materials. Helpful as they are, the efforts of users, converters, and suppliers leave a lot to be desired. Taking just one example, we hear that quite a few people would like better material for skin packaging.

2. Better production control and on-the-spot testing. The technical people are doing well at refining the test structure for various materials and packages, but most of this is the "referee" sort of thing and offers scant help to the man on the packaging line. We think this year will bring us marked improvements in packaging line instrumentation and control—and methods calculated to let a packaging machine attendant correct trouble while it is happening.

3. Less guesswork in packaging decisions. The present trend to more quantitative decision making and less "flying by the seat of the pants" will continue. For instance, specification makers are showing progress in reducing to measurable terms, values and attributes previously left to guesswork.

4. Intensified efforts to cut waste. We see this occurring in two ways: (a) over-filling a product to avoid the perils of under-fill and (b) over-packaging through excessive use of packaging materials. More packagers are learning how to hit their fills "on the nose," and they are making definite progress in tailoring packaging requirements to specific, measurable needs—thus cutting out the wastes inherent in using too heavy a carton stock or too many plies in a lamination, for instance.

In this connection, we are glad that American Management Association has made a grant to Rensselaer Polytechnic Institute to find out more about the packaging function. AMA some time ago committed itself to using part of the admission money from its annual packaging shows to help the cause of packaging education. While AMA and others in the field recognize the value of the pioneering efforts of such schools as Michigan State University, at the same time it is common knowledge that not enough is known about the packaging function.

So, AMA is letting the Rensselaer people find out just what the packaging function is. We look forward to the results of this study and, in the meantime, hope that packagers asked to participate in it will cooperate fully.

A basis for education, a guide for management

We see two values in this study. First, it will furnish guideposts to packaging education. It will be easier to plan articulately for packaging education when you find out just what the packaging job is for which you want to educate people. Second, it should prove a catalyst to the refinement of the technique of managing the packaging function. This is a need; even a casual tour of the packaging field reveals all sorts of management practices and all degrees of recognition of packaging by top management.

We hope all this makes top management people more conscious of the demands packaging now faces. There is nothing quite like wholehearted management support to help us find answers to the four pressing problems now in our midst: (1) more research on materials, (2) better production control, (3) more quantitative decision making, and (4) greater efforts to cut the waste out of packaging. Then the sooner we find these answers, the sooner we can do the kind of job that will let us reap the rewards the trumpeters of prognostication hold out for us.

Bruce Hoffman

Editor

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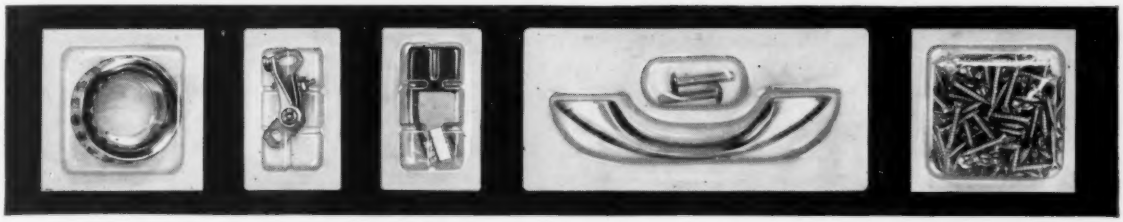

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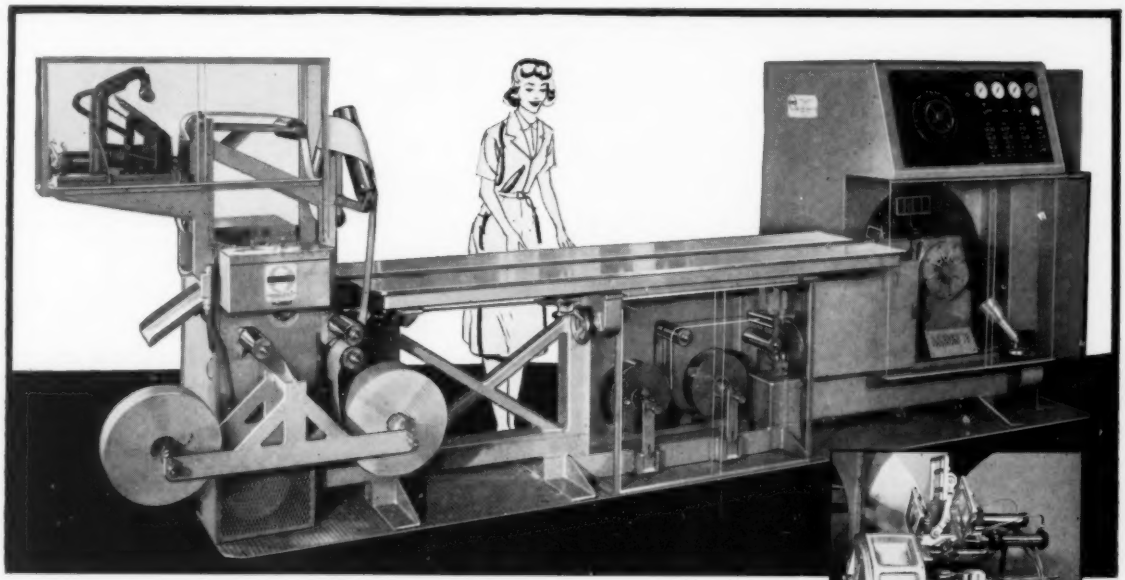

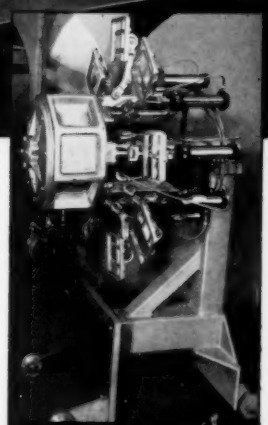

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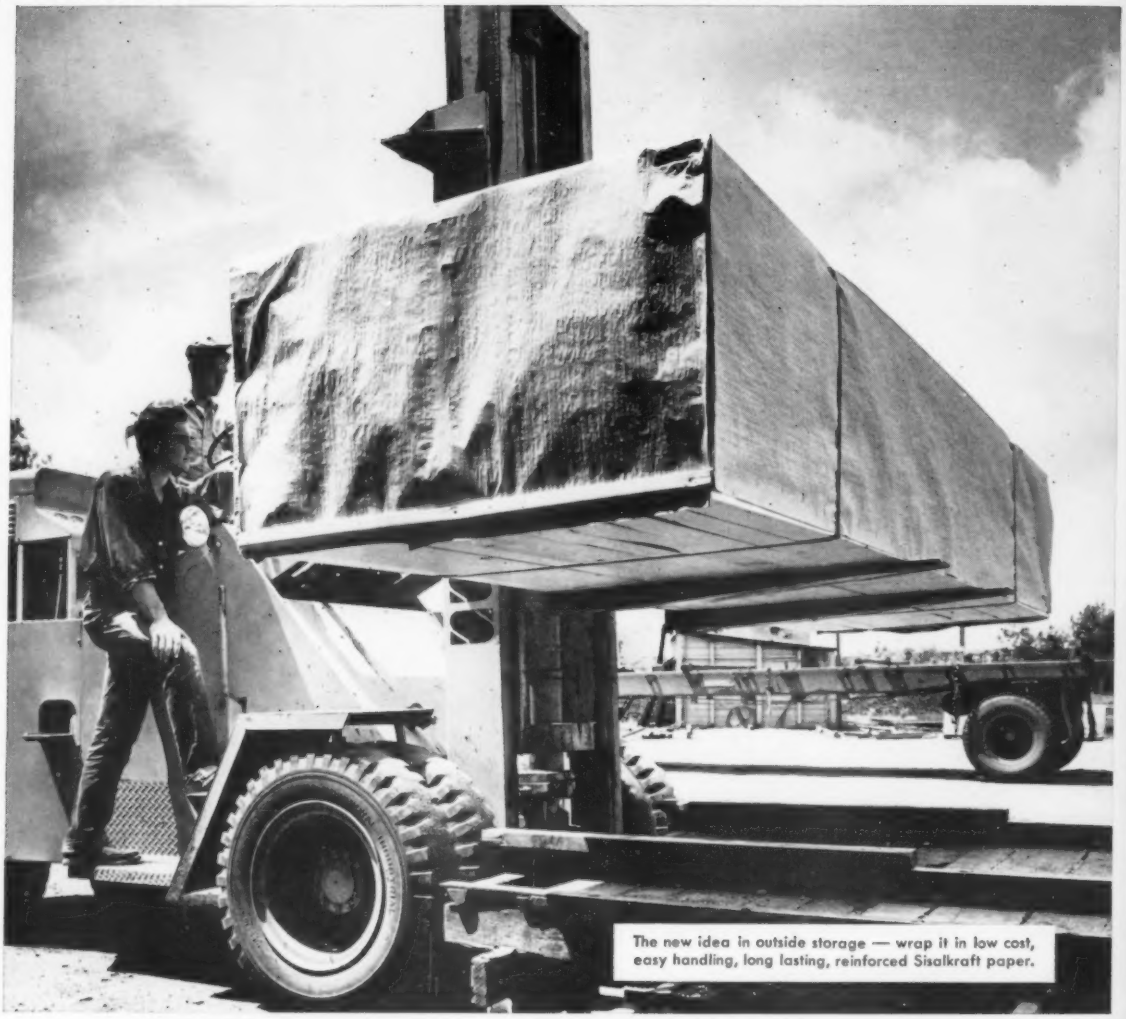

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